MEMORIAL

TO

THE CONGRESS OF THE UNITED STATES,

REQUESTING

AN INVESTIGATION AND LEGISLATION IN RELATION TO THE NEW METHOD FOR REFINING GOLD,

OF

PROF. R. S. McCULLOH,

OF THE COLLEGE OF NEW JERSEY, LATE MELTER AND REFINER OF THE UNITED STATES MINT.

Princeton, N. J.:
JOHN T. ROBINSON, PRINTER.
1851.

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MEMORIAL.

To the Honorable the Senate and House of Representatives in Congress assembled:

Your memorialist, Richard S. McCulloh, of Princeton, New Jersey, most respectfully requests, that you will consider the facts presented in the following communication and take such action thereon, as the public welfare and your sense of justice may demand.

In the year 1844, having been nominated by Professor A. D. Bache, as a suitable person to make scientific researches, under his superintendence, in relation to sugars and hydrometers, I was employed by the Treasury Department, for that purpose; and the results of our investigations have since been published in Sen. Doc. No. 50, 1st Sess. 30th Congress. While engaged in April 1846, in the examination of the chemical nature of the cane, and of the processes used for the manufacture of sugar, in the island of Cuba, whither I had gone by order of the Secretary of the Treasury, I received intelligence that the office of Melter and Refiner of the Mint had, without solicitation by myself or my immediate friends, been conferred upon me by the President, with the advice and consent of the Senate; and I was requested to return home, as soon as practicable, to enter upon the duties of that office, then vacant by resignation; which I accordingly did, without abandoning, however, the labors in which I was engaged; but, of my own accord, relinquishing all compensation for their further prosecution and completion.

In the year 1849, after the receipt of large deposites of gold from California, I repeatedly requested the Director of the Mint to permit me to enlarge its refining capacity, which was then only $100,000, per month. He hesitated to do so, but instructed me to confer with other officers of the Mint, and conferences were accordingly held. About the 1st of July, when $750,000 in gold arrived from California, the Director gave me authority for action, and urged me to do all I could to protect the Mint from discredit, under the circumstances which existed; the task was a difficult one, but I undertook its performance, and assumed all responsibility, upon the condition that I should be clothed with full and discretionary power, both

to meet the present emergeney by temporary arrangements, of whatever kind I might be able to make, and to provide new and superior apparatus, such as I might invent, and construct at moderate cost, for future refining upon a greatly expanded scale.

Apparatus devised for introducing the advantages of steam, and capable of being easily enlarged (which has since been done) was promptly constructed; and the refining capacity of the Mint was thereby increased at once to $1,500,000, per month, without changing the chemical process in use, or interrupting the refining operations; which, by the aid of temporary contrivances, were carried on much more heavily than had ever been done before.

While I was engaged in the construction of the aforesaid new apparatus, the imperfections of the methods used for refining argentiferous gold, at home and abroad, were frequently the subject of my serious thought; and I was consequently led, when it was completed, to seek more economical and efficient means for that object than any previously tried. My experiments were at first directed to the employment of chlorine, or nitro-muriatic acid; with which, under my immediate supervision and direction, small lots of very impure gold had occasionally been refined, by the foreman of the refining department, John Monell, Esq., though always with much trouble and difficulty. What I attempted was the subject of general conversation in the Mint, the more so because I abandoned the investigation, by reason of inherent difficulties; which were, in my opinion, such as to preclude the use of chlorine in refining, as it would injure the health of the workmen if breathed by them; and that abandonment was deemed a failure.

About this time, I was invited to the professorship of Natural Philosophy in the College of New Jersey, at Princeton, which appointment I accepted, and therefore resigned my office in the Mint, and united with the Director in recommending as my successor Prof. James C. Booth, to whom I had long been a professional and personal friend, (see Appendix No's. 1, 2, 3.) Before quitting the Mint, however, and while engaged in the labors requisite to close my accounts therewith, I tried an experiment upon refining gold by the use of zinc, with imperfect but promising results; I called the attention of the Director of the Mint to the process, explaining it fully and speaking of it to him, as a mode of refining, which might, if completed, supersede with advantage any other known method.

After I had entered upon the duties of my chair at Princeton,

in pursuance of counsel which had been given to me by my friends, I perfected my process for refining with zinc, and took steps to obtain patents therefor, both in Europe and in the United States, by filing a specification as a caveat in the Patent Office, at Washington, and making arrangements to procure the services of a suitable agent to go abroad on my account; which was subsequently done by Sam. F. Butterworth, Esq., who thereby became a party of interest in my invention.

On the 11th of February 1850, I wrote to the Director of the Mint, offering to the government the use of my discovery and stating some of its advantages, (see Appendix No. 4.) But he made no reply to my communication.

On the 1st of July 1850, I addressed a letter to the Hon. W. M. Meredith, Secretary of the Treasury, setting forth the importance of my invention, and proffering any further information which might be desired: although my application for letters patent was then filed as a caveat. My letter was referred, on the 2d of July, to the Director of the Mint, for his views, who, on the 6th of July, replied that neither he nor any officer of the Mint had been made acquainted with the results of my process, and that no opinion of its merit and value could be properly given, until the process should be fully made known to the officers of the Mint and be tried upon a large scale, (see Appendix No's. 5, 6, 7). He, however, overlooked my offer of any further information to the Treasury department.

On the 5th of July, having been advised by my counsel, that special legislation would be requisite, to permit the government to acquire the right to use my discovery in the Mint and its branches I memorialized your honorable bodies in relation thereto, (see App. No. 8); and in my memorial, offered to grant to the United States the right to use my method of refining, for a valuable consideration, which might be either a just sum in gross, or a fair share of the saving in labor and materials, effected by the use thereof.

In a letter addressed to me, at Washington, dated July 9th 1850, (see Appendix No. 9) in which allusion was made to another letter previously written to me at Princeton, but not received, by reason of my absence from home, the melter and refiner of the Mint, Prof. James C. Booth, informed me: that he had every reason to believe he had been pursuing my method of refining; that he had "worked a few hundred pounds of gold with zinc in various ways;" that the Director of the Mint had shown him "the Secretary's letter in relation to" my communication and had learned from him that he supposed he "knew what

the patent was," and that he "had been working with it for some time;" and that the Director supposed I "would ask a large sum for it" and had been told by him that he thought "it worth it," and that "if it were" his patent, he "would value it very high, say $50,000 in the U. S., or probably double that amount." Also he stated, therein, that in his former letter he had proposed to me a union of processes, "not knowing that [I] had completed" mine; and wishing me all success both at home and abroad, he offered me the assistance of his opinion concerning my process, as one which he had worked "all out in detail on large quantities of metal," but found to be not his own.

About the 11th of July, I visited the Mint, without seeing the Director, who was then absent. I, however, saw Prof. Booth, showed him a copy of the specification of my patent, which he read in my presence, and requested him not to use my process other than experimentally. I learned that he was then making experiments with it, and that he had found some difficulty in toughening the refined gold; but I was not informed of the details of what he had done, or was doing; and I forebore to give any particular instructions or advice to him, or to the workmen, from motives of professional courtesy and a sense of propriety.

When I had returned to Princeton and found there the above-mentioned letter of June 29th, from Prof. Booth, (see App. No. 10,) containing an allusion to difficulties to be overcome, but of which nothing had been said in his letter of July 9th, with a proposition for an union of processes, and a subjoined statement that his object was "not for the mint, but to engage some friends to carry out the refining upon a large scale," I wrote to him on the 16th of July, (see App. No. 11,) and in my letter indicated the causes of any difficulty, which could at any time occur, in toughening gold refined with zinc; and I repeated my request, that my process should not be made public, my application for a patent being then filed as a caveat, so that I might obtain letters patent in Europe.

About the 28th of July, I called at the mint, for the purpose of seeing the Director, and of learning from him his opinion in relation to the purchase by the United States of the right to use my discovery. I explained to him its nature, and showed him a copy of the proposed clause for the civil and diplomatic appropriation bill, which I had submitted to your committees, to whom my aforesaid memorial had been referred. He received me with the same cordiality of manner, which had always characterized his intercourse with me; recollected and spoke of my aforesaid experiment, made and shown to him, before I left the mint; and

remarked, that he saw no objection to the legislation, which I proposed to obtain, but was undecided as to the course which should be pursued by himself in relation thereto. At the close of our interview, he suggested that I should write to him from Washington, whither I was going, that he might give me an official reply, to be shown to the aforesaid committees, and to other members of your honorable bodies. When I had reached Washington, I addressed to him, for reasons therein stated, a private instead of an official letter, dated July 29th, (see App. No. 12,) asking the expression of his views and wishes, that I might know and endeavor to conform my action to them; but I received no answer from him.

On the 7th of August, 1850, Prof. Booth verified by his oath in Washington, his application, dated August 5th, for letters patent for a method of refining gold, by the use of chlorine or nitro muriatic acid, and assigned an interest therein of one fourth part to C. Morfit, Esq., for valuable consideration. (See App. No. 13.) And on the 13th of August, he wrote to me stating that he had worked $100,000, by my process, part of which proved "so brittle after melting," that he was "at a loss what to do with it;" that he had "not made many experiments on the gold," and had "not time to do it," and that he "was so disappointed in this result," that Morfit and himself "had been working out another process of refining on different principles," which he believed would "be very successful." (See App. No. 14). In reply, on the 14th of August, I addressed him a letter, of which I did not retain a copy, but in which, if I remember aright, I expressed my willingness to form an equitable union with him, if he had invented a process for refining gold, as valuable and efficient as my own, and would first make known to me the nature and details thereof.

In his answer to me of August 16, (See App. No. 15), Prof. Booth expressed his belief, that "it would be to the detriment of both parties to compete on the merits of their respective processes;" but said, that he could not "mention the nature" of his process, until he should "receive permission so to do from [his] lawyer," H. M. Morfit, Esq., of Washington City, and that he had obviated all objections to the use of his process and rendered "it short, easy of execution, and the cheapest yet devised." I, accordingly, wrote to my father, J. W. McCulloh, Esq., late Comptroller of the Treasury, requesting him to confer with Mr. Morfit. In their interview, Mr. Morfit expressed the opinion that the two plans should be united, for the mutual benefit of their proprietors; but said, that the process of Mr.

Booth could not be explained; that a preliminary and hypothetical understanding might, however, be had; and that, if the arrangements were confided to him, which he would deem essential, they might be completed, without recourse to Congress, within twenty days, by means of a contract to be made with the Director of the Mint, for the supply of materials; which, however, was deemed, by my father, to be impracticable, under the enactments relating to the business and organization of the Mint.

In his letter of the 22d of August, Prof. Booth promised to call upon me at Princeton, but remarked, "there need be no hurry in the matter, for Congress will scarcely do anything for it at this session." In his letter of August 30th, he spoke of action as not necessary, unless my patent would "come before Congress" that session; and inquired of me whether I intended to urge it at that time. (See App. Nos. 16 and 18). In my reply, on the 4th of September, from Washington, (see App. No. 19,) I informed him, that my memorial to your honorable bodies would certainly be acted upon by the committees to whom it had been referred. And, on the 5th of September, the Director of the Mint addressed a communication to the Commissioner of Patents, (see App. No. 20), urging that the examination of Prof. Booth's application for letters patent should be expedited, "that the interests of the Mint" might "be promoted thereby;" a request, which appears strange when regarded in connexion with his apparent indifference to my own discovery, and with the above remarks of Prof. Booth.

On the 9th of September, (see App. No. 21), H. M. Morfit, Esq., as attorney for Messrs. Jas. C. Booth and C. Morfit, petitioned the Hon. Thomas Corwin, Secretary of the Treasury, to instruct the Director of the Mint, with the view to the acquisition of Mr. Booth's process, "to compare it *in all results*, with any other used or known, at that office, for refining gold, and to report the particulars of that comparison as well as the value of the process to that office." Such instructions were given, (see App. No. 50), as I have recently learned; and, in order to carry them out, the Director entrusted the trials to be made to Prof. Booth, (see App. No. 52 and 53), who was thereby virtually constituted the judge of the comparative value and merit of his own invention, upon whose determination the government was to depend for its proposed purchase. In an interview with the Messrs. Morfit, on the evening of the same day, September 9th, I was informed by them that they had presented the subject of Mr. Booth's process to the attention of the

Secretary of the Treasury; that they were about to memorialize Congress in relation thereto; and that they would proceed in opposition and competition with myself, unless I should at once unite with them; which I expressed my willingness to do, if first informed by them of the nature of the process of Mr. Booth. But I treated any proposed union as inadmissible, without such a disclosure on their part; and as they declined to make it in the absence of Mr. Booth, and proceeded on the next day to memorialize your honorable bodies, in behalf of Messrs. Booth and Morfit, I summoned Mr. Booth to Washington, by telegraph; which was done also, I believe, by them. On his arrival, I demanded of him full information concerning his process, as prerequisite to any union of interests. By advice of Mr. Morfit, he deferred to make any statements to me of its nature and details, until the following day; when I understood from him, that the order to issue letters patent to him had just been given; and he then consented to inform me of his invention. He began by asking me, what were the difficulties I had met with in my aforesaid abandoned experiments, made in the mint, upon the agency of chlorine or nitro-muriatic acid for refining gold; and, when I had answered him, he proceeded to tell me by what means he had succeeded in overcoming those difficulties. I presented some doubts which occurred to my mind, but he assured me, that they were inconsistent with facts which his experiments had fully established. He informed me, as I remember, that he had refined several ounces of gold by his method, with perfect success, in every respect; and, if the scale of his experiments should appear small, his extensive cobalt workings in a chemical factory, in which he is a partner, by processes involving much which he had adopted in his invention for refining gold, enabled him to state from knowledge, that his method was all that could be desired, and far superior in economy to my own. Relying upon his chemical skill, and his assurances of the value of his patented invention, I formed with him a union, by assigning to him a moiety of my patent, in exchange for a moiety of his own, copy of which mutual assignment (see App. No. 22,) is annexed.

After we had united our patented inventions, Prof. Booth concurred with me in offering them both to the Government, through the Committee of Finance of the Senate; and in assuring that committee of their value and importance to the Mint, as well as that it was the desire of the Director of the Mint to obtain such advantages as they would each afford. It, therefore, pleased that committee to offer, as an amendment to the civil

and diplomatic appropriation bill, a clause, framed by themselves, but substantially agreeing with the proposition I had made, to grant the right to use the aforesaid inventions, for a share of the saving in the cost of labor and materials to be effected for the profit of depositors of bullion, without the payment of any money whatever from the Treasury of the United States ; which, on the contrary, was to be greatly benefitted by the large saving of interest on public money, to the extent of millions of dollars, to be released from the Mint, and which in the use of the old method of refining must be kept there, at an expense to the United States of six per cent per annum, for the accommodation of depositors of bullion, by advances upon their deposites before the same can be refined for coinage. The aforesaid amendment was unanimously adopted by the Senate, but it was rejected by the House of Representatives; and a different amendment, framed by your committees of conference, appropriating $25,000 to enable the President to obtain the right to use my invention and that of Prof. Booth, or any other invention for refining gold which might be discovered if he should deemed it expedient to do so, was adopted and passed by your honorable bodies.

While the subject of providing for the acquisition of the right to use our inventions was under the consideration of the Committee of Finance of the Senate, I requested Prof. Booth, in a personal interview with him, at Washington, to urge the Director of the Mint to recommend the legislation we were seeking, and proposed to write to him myself, making a similar request. According to my recollection, Prof. Booth stated, that he would ask the Director of the Mint to do as we wished, and that he did not doubt, that he would willingly recommend legislation upon our inventions, as he had already written to the Commissioner of Patents, for the purpose of aiding the Messrs. Morfit and himself in more promptly obtaining a patent; but dissuaded me from writing, for the assigned reason, that "the officers" of the Mint were "hostile" to me, though the Director might "probably be less so than others." I replied, as I remember : that I was not before aware of hostility towards me, on the part of any officer of the Mint, except the Coiner, Mr. Franklin Peale, although I knew the Director to be greatly under his influence, and had been disappointed in not receiving answers to my letters ; that, my necessarily independent course of official action, as Melter and Refiner of the Mint, in the aforesaid invention and construction of apparatus to expand the refining capacity, the success of which was at the

time doubted by most of my colleagues of the Mint; or, my previous non-concurrence in a plan proposed by them, for getting the refining done out of the Mint by private persons, to which I had objected for reasons stated and not controverted, might *possibly* have given slight offence; but I could scarcely believe that any officer of the Mint, except the Coiner, Mr. Peale, and the Director, Dr. Patterson, could be *hostile* to me: and for even their hostility, there was no just reason, as it could be due only to my having been obliged to decline to furnish bullion to Mr. Peale, for the manufacture of medals in the mint for his private gain, which, though sanctioned by the Director, I had deemed illegal and in its tendency demoralizing. (See App. No. 68,) I then further remarked to Prof. Boeth, that as I had shown to him said correspondence, for his information and precaution, when he entered upon the duties of his office, I hoped he had kept himself clear of Mr. Peale's medal-making business. He replied, as I recollect, that he had furnished bullion when requested to do so, not regarding the matter as I did, nor considering himself obliged to know what might afterwards be done with it.

After Mr. Booth returned to Philadelphia, I received from him a letter, dated September 21st, 1850, (see Appendix No. 23,) informing me, that the Director of the Mint had written to the Chairman of the Committee of Finance, though with some hesitation, objecting at first that "to state that a better process for refining was desirable, if we could get one, was to state a truism;" that he was preparing "to try our processes at all events before the officers of the Mint as they [were] desirous to see them carried out, and if they are better than the present process, to adopt them or one of them;" that they would "evidently throw no impediment in the way, unless it be as to the manner of determining the cost of the present and the new processes," and that he could "make the trials in a few days." In this letter, Prof. Booth also expressed his fear that I might "think that some of the officers entertain a more serious prejudice against [me] than they really do from what" he had said to me "to induce" me "not to write to" Dr. Patterson; and his knowledge "that the Dr. does not like to do anything unless officially required, lest he should give umbrage to others," which feeling might "induce him to be backward in relation to patents for processes, but, if officially required," he thought "he would give a ready and an honest reply, on any subject connected with the mint."

In my answer to Prof. Booth, of September 23d, (see App·

No 24,) I remarked that: "to have stated that the mint is now overtasked with refining; and, *therefore*, that a more efficient method is both desirable and necessary, would certainly have been to do more than merely to utter a truism;" and that I could "see no reason, upon reflection, why Dr. Patterson should have hesitated to do so, at [his] request, and for the information of the Secretary of the Treasury and the appropriate committees of Congress." And, as he had spoken of impediments being thrown, by the officers, in the way, "as to the manner of determining the cost of the present and new processes," I observed: that said determination would "have to be performed, after the passage of the act, in pursuance of such directions as the Secretary of the Treasury might then give;" adding, that "as interested parties, we, of course, would each have and exercise the right to know and be satisfied, that the determination be just and true; and until so satisfied, we would make no contract." Also, I directed him, in my letter, if he should try my process, to work the gold upon a test, and to use for the purpose "the large test furnace in the cellar." Shortly afterwards, I saw Prof. Booth at Jones' Hotel, in Philadelphia, and he then orally objected to try my process, in the manner prescribed by me, and as set forth in the specification of my patent, alledging against such a trial a hypothetical difficulty, which I indicated to him ready means of obviating, though I did not suppose that it could possibly occur with proper management.

Subsequently to this interview, and from the 7th of October to the 5th of December, a series of letters, (see App. No. 25 to 40), passed between the Messrs. Morfit, Prof. Booth, my father and myself. In some of which letters, inquiries were repeatedly made by me of Prof. Booth, in relation to the experiments he was trying, and about the aforesaid $100,000, which he commenced to refine by my process, in July, and left unfinished, but without receiving from him satisfactory information. Delays, "unanticipated difficulties," incompleteness of his own process, the trial of a supposed improvement upon mine and of other modes, because he had "objected to the method of toughening proposed" by myself, (see App. No. 35), with reiterated promises of a report "in the course of a week," were substantially his short and indefinite replies. At length, in his letter of Nov. 25th, (see App. No. 35), he announced to me that he had "obtained toughened gold by both processes, and [could] work either of them upon a large scale." But, in his subsequent letter of Dec. 5th, (App. No. 40), he informed me that he was "sorry to say that it was but in a single experiment that [he]

obtained toughened gold by the zinc process, and that all others with the same lot gave a brittle metal. This was the last of the $100,000;" and he added: "I think you will now see clearly that any action now would be premature, until the process or processes have been shown to be successful."

Much of the contents of the aforesaid series of letters, (App. No. 25 to 40), also related to the question of whether or not the appropriation of $25,000 should be accepted for only one or both of the processes: a question, however, which by your legislation you have not left open, as it has provided only for the acquisition of *both* of our methods, or of any other method which may be discovered. On the part of Messrs. Booth and Morfit, an earnest desire that the $25,000 should be accepted was expressed, and they urged me to concur therein. I, however, deemed it most wise not to form any determination until I should know that the Government was willing to purchase the processes; and I declined to bind myself, prematurely, to any course of action in relation to a proposed report from the Director of the Mint, before it should be made and its contents should become known to me.

Also, in several of said letters (see App. Nos. 36, 38, 39), I expressed my opinion freely concerning the course pursued at the mint, that it was regardless of my own as well as of great public interests; and, ascribing it, in a great measure, to hostility felt towards myself, I did not hesitate to declare it to be my intention, if compelled so to do, to hold the officers of the mint to a strict account, as public servants, for any neglect or violation of official duty in relation to my own jointly with the aforesaid public interests.

As Prof. Booth had made to me only inconsistent statements, with regard to his experiments, with his own process, as well as mine; and as I was most unwilling that his protracted mismanagement of my invention should reflect discredit alike upon it and my professional reputation, I wrote to the Melter and Refiner of the branch Mint at New Orleans, Dr. M. F. Bonzano, on the 23d of November last, requesting him to try my method of refining upon a working scale; to the end that his results might confirm those obtained by my own careful and successful investigations; as they would constitute evidence furnished by a fully competent and entirely disinterested party, himself a sworn officer of the United States. I received from him a prompt reply, dated Dec. 10th, (see App. No. 41), in which he reported the details of a successful trial of my process; with accompanying remarks upon the great advantages afforded

by it, in dispensing with the enormous amount of silver used in the old methods of refining, with the wastage thereof, and with the great labor and large apparatus necessary for working said silver.

In consequence of my dissatisfaction with the abovementioned proceedings at the Philadelphia mint, and of the remarks of the Secretary of the Treasury, contained in his last annual report, that, "if the experiments now progressing under the authority of Congress, for testing a new process of assaying, should equal the expectations, which have been formed respecting it, the capabilities of that establishment will be extended to the coinage of eight millions monthly," I addressed to the Secretary, on the 23d of December last, (see App. No. 42,) a letter; in which, after setting forth succinctly the principal facts stated above, and verifying the same by references to accompanying copies of letters, I requested him to take such action as, in his judgment, might be, "requisite to cause the respective merits of the said methods of refining to be correctly and immediately determined;" and I respectfully suggested, "that the desired end might be attained, by instructing the Director of the Mint to have my process tried without delay, under my direction and in the presence of Prof. J. C. Booth, by such workmen as should be detailed at my request, and the process of Prof. Booth similarly tried, under his direction, and in my presence."

After making this communication to the Secretary of the Treasury, I received from Dr. Bonzano two other letters; in one of which he stated, among other things, that he had failed in a second experiment, which in his aforesaid letter of December 10th, (see App. No.41), he spoke of, as one in hand, upon forty ounces of California gold, promising to let me know the result in a few days. In the other of his aforesaid letters, dated December 23d, 1850, (see App. No. 43,) the Melter and Refiner of the Mint at New Orleans reported four successful experiments on refining by my method, and that "no difficulty of any kind presented itself, during the different stages of the process." On the 1st of January, 1851, I submitted a copy of this letter to the Secretary of the Treasury, with such accompanying remarks (see App. No. 44) as I deemed appropriate.

On the 3d of January, (see App. No. 45,) I requested Mr. Booth to furnish me a report of the results of his experiments on refining gold, in fulfilment of the assurance given to me, in his letter of November 25th, that he would be able to make such a report in the course of a week. In reply, he informed me,

(see App. No. 46), that he could make a report, "but as it would not be satisfactory" he was sure I did "not wish it any more than" he did; also, that he was "erecting a test furnace," with which he could try my process fully. I, therefore, felt obliged to write to him, (see App. No. 47,) that more than three months had elapsed, since, "in reliance upon" his assurances that he "had discovered a better and cheaper method of refining gold even than my own, I entered into an agreement" with him to unite the two; and that it would seem that, "instead of establishing the efficacy" of his method, he had "been enlarging the arrangements for refining by the old, costly and slow process, to a two or three-fold extent; and, of course, at considerable expense." To which I added that, if his process was what he had "stated it to be, I" could not "comprehend the course" he had "pursued, for increasingly heavy deposites have only constituted an urgent reason, why a cheap and more efficient method should have supplanted the one in use, rather than that the latter should be perpetuated and expanded; if, on the contrary," his process was "attended with difficulties," then, that he owed it to himself "as well as to me, by reason of the aforesaid assurances, to communicate them to me promptly, fully, and unreservedly," which I requested him to do. Of my process I remarked: that I had "foreborne to press it, for I expected" him to adopt his own, "pronounced" by him "to be superior; although" I had "known mine to be one which at any time may be shown in 48 hours to be all that is needed." In his answer thereto of Jan. 14th, (see App. No. 48), Prof. Booth offered vague excuses for his continued unsuccessful experimenting, and declared it to be "wholly unnecessary to enter into detail in relation to the difficulties" he had "met with in carrying out" his process or mine, "on a working scale, for want of time" compelled him "to be brief."

Nor has Prof. Booth, though told by me, (see App. No. 54.) that I "cannot consider any reason sufficient" for his "continuing to keep me in ignorance of the difficulties" he may have "met with in trying" his own "process upon a large scale," since seen fit to give me any information concerning its defects. Yet the Director of the Mint has reported the results of Mr. Booth's experiments with his own process as unsuccessful, by reason of its "imperfection," (see App. No. 52); and C. Morfit, Esq,, his associate in his invention, has recently admitted to me, in a personal interview, the existence of said defects; declining; however to inform me specifically of their nature. And

why such information should be withheld from me by them, I am at a loss to imagine, unless it be, that our mutual assignment may have been made, without my having received from them valuable consideration, which would be the case, if the aforesaid "imperfection" of Mr. Booth's process renders it destitute of proper efficiency and, therefore, valueless.

On the 16th of January, I wrote to the Secretary of the Treasury, (see App. No. 49), requesting that copies of any letters from the Treasury department to the Director of the Mint, concerning my new method of refining gold, might be furnished to me. It pleased the Secretary to comply with my request; and I, therefore, received a copy of the letter to the Director of the Mint, of September 10th, 1850, (see App. No. 50,) instructing him to compare the proposed plan of Messrs. Booth and Morfit, "in all results, with any other used or known at the mint, and to report to the Department all the particulars of such comparison, as well as the value of the process in refining gold;" together with copies of the letter, of January 11th, 1851, (see App. No. 51,) written in accordance with my aforesaid suggestion, that instructions should be given to the Director of the Mint, to cause both my method and that of Prof. Booth to be tried, without delay and in the presence of both parties, and of the reply from the Director of the Mint, (see App. No. 52,) dated January 14th, 1851, enclosing copy of a report to him, (see App. No. 53), from Prof. Booth, dated January 13th, 1851.

In the aforesaid reply of the 14th ult., from the Director of the Mint, (see App. No. 52), he has stated that he reported to the Treasury Department, on the 16th of December last; "that the experiments referred to *had* been prosecuted at the mint, but that the results had not proved satisfactory." And he added, "if no success has yet resulted, the cause is to be attributed, not to lack of experiments, but to the imperfection of the processes themselves, when tried on a large scale." But, instead of reporting to the Secretary of the Treasury, as he had been instructed to do, when a trial of both processes could be made in my presence, as well as in that of Prof. Booth, the Director saw fit to disregard these instructions; maintaining, erroneously, if Mr. Booth's own process is imperfect, that he "has every inducement to prove the feasibility of either, or both of them, and their superiority over the present methods," and that "his official energy and integrity," as well as "the promptings of his private interests," furnished the fullest assurances that, even

in "a final and decisive experiment," the work "would be properly done," by Prof. Booth alone, though the experiments performed by him had "not thus far proved successful." All of which was inadmissable, for the aforesaid instructions of the Secretary of the Treasury, given in compliance with my request, as an interested party, did not authorize the Director of the Mint to fix the manner in which the trial of the processes of Prof. Booth and myself should be conducted, but expressly required that it should be performed in my presence.

In the abovementioned report of Prof. Booth, to the Director of the Mint, dated January 13th, 1851, copy of which has been furnished to me by order of the Secretary of the Treasury, (see App. No. 53,) the "difficulties of experimenting," during the preceding "three months," in consequence of the "untiring exertions required to bring up the working capacity of the mint to meet the demand" occasioned by the "rapidly" increasing "quantity of gold deposited," and "the necessity of altering the apparatus to meet the increased deposits," are set forth, in justification of his failure to make successful trials of the new methods, invented for the very purpose of giving the increased power so much desired. And his statements, in relation to said difficulties, were coupled with the remark that: "it is a mistake to suppose, that Mr. McCulloh's process has not been tried; it has been tried again and again, and the methods of toughening the gold varied, without success." Concerning all of which, I would here remark: that if my process had been tried properly by Prof. Booth, by the use of the preferred means, indicated in the specification of my patent, as well as in my letter to him of the 23d of September, (see App. No. 24,) to wit, the employment of "the large test furnace in the cellar," instead of his aforesaid "varied methods of toughening," it would not have been tried "without success;" for such a trial since made by him has been successful, (see App. No. 64): that, therefore, the only reason why Mr. Booth's experiments upon my method of refining had been attended with unsuccessful results, subsequently to September last, was, that he objected to, (see App. Nos. 35 and 55,) and would not try that method properly: and that, if a successful trial of my method had been made in the mint, in October last, or previously, as might and should have been done, there would not have been even any apparent necessity for altering and enlarging the arrangements for refining by the old method, in order to expand the working capacity of the mint; nor, for protracted delays of payment, attended with loss of interest to depositors, if the coining machinery be ample;

nor, therefore, if such be the coining power, for keeping in the mint more than five millions of the public money, at an expense to the Treasury of interest thereon, at the rate of six per cent. per annum, to enable the mint to shorten said delays, by making advances for the accommodation of said depositors.

In Prof. Booth's report, (App. No. 53), he also stated that: "Mr. McCulloh proposed a new plan for remedying the defect of his process." Of which he remarked: that, it "required a large cupel furnace;" and that there was no place in the mint in which such a furnace could have been erected, until some time in December, when," after a new building was completed, he was "put in possession of a space wherein to extend" his operations, and "immediately commenced erecting such a furnace." And in his letter to me of January 4th, (see App. No. 46,) he had similarly informed me that he was "erecting a test furnace," with which he could try my process fully, and that his "reason for not erecting it before was that it would have seriously interfered with the work of the mint." As in my communication to the Secretary of the Treasury, of January 1st, (App. No. 44), I had informed him: that Prof. Booth had "possessed every facility for trying my method upon large quantities of gold in the manner specified by me," including, of course, "a large cupelling furnace;" and as, in his aforesaid report of the 13th of January, Mr. Booth had erroneously ascribed to me a suggestion which I had never made, I wrote to him, on the 21st ultimo, (see App. No. 54), remarking: that I had "left in the mint a large test or cupelling furnace," and had requested him "to use that furnace," if he "should try my method for refining gold:" that when I met him, "early in October last, at Jones' Hotel, the use of a test for toughening, was objected to" by him: that in his "letter to me, of November 25th, 1850," (see App. No. 35), he "stated that, having objected to the method of toughening proposed, [he] had been trying others:" but that I had "yet to learn from [him,] why it should have been found necessary to erect a new furnace, merely, for the purpose of trying my process, if the old furnace [was] still in existence, or [had] not been torn down since I requested [him] to employ it; or why, if the use of a test or cupelling furnace [was], at length, about to be tried by [him], it should be deemed by any one a modification or improvement upon the process specified in my patent; or, why the suggestion of using muriatic acid, as a means of obviating brittleness should be ascribed to me, as I [had] no recollection of having ever proposed, and would have deemed such a means objectionable, *a priori*, and as I [did] not

find any allusion to such a proposition in our correspondence." In his reply to me of January 23d, (see App. No. 55), Mr. Booth admitted that "the removal of the cupel, that was" in the mint had caused the necessity for "the erection of a new furnace," to try my process; and of the proposed "use of muriatic acid for toughening the gold derived from "my process, he stated that the suggestion was made to him by the foreman of the refining operations, Mr. Monell, though he had understood "that it came from" me.

After having received from the Treasury Department and carefully considered the contents of the aforesaid copies of official letters, I addressed to the Secretary of the Treasury a communication, on the 23d of January, (see App. No. 56,) in which I invited his attention to the circumstances, that the Director of the Mint had "taken leave altogether of the expressed wish of the Department, that the methods of refining gold, invented respectively by Prof. Booth and myself, should be tested, *in the presence of both parties;*" and that he had not reported, as "requested to do, when he [could] enter upon such a trial and the probable time it would require:" but had, "in avoidance of those instructions, concluded, that trial of these inventions need not be made in the presence of both parties, erroneously assuming that my presence" was and would be unnecessary, notwithstanding the "express instructions that both should be so tried without delay." I also argued: that as the union between Prof. Booth and myself was "based upon averments," made by him, that his process of refining was more efficient and economical than any other known method, and as he has "not met with success in trying his own method, there would certainly be an eminent propriety in my being permitted to judge for myself, by observation, of the nature and degree of the defects of the process of Mr. Booth; especially, as I have been and still am kept in ignorance thereof, after having repeatedly requested information of him." And of my own method, I remarked: that "if Prof Booth, after varied experiments, had failed to work it upon a large scale, there was certainly more than sufficient reason for its being tried in my presence, and according to the specification of my patent." I called the attention of the Secretary to the apparent variance, between my statement, that the mint in Philadelphia had been "provided with a large cupelling furnace," and Mr. Booth's aforesaid declaration, that: "Mr. McCulloh proposed a new plan for remedying the defect of his process, which succeeded on a small scale, but to test which on a working scale required a large cupel furnace. There was no

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place in the mint, in which such a furnace could have been erected until some time in December, 1850," &c. Upon which, I remarked, that: "I left a large cupelling furnace in the mint; that, in a letter of September 23d, 1850, to Prof. Booth, I requested him to use it, if he should try my process; that, when I saw him in October last, he objected to the use of such means, not, however, because of any alleged want of a proper furnace; and that, if it was now necessary to erect a new furnace to try my method, the old one must have been pulled down, and most probably since I made that request." I also observed: that I could not imagine why Prof. Booth should speak of the "operation of cupelling, as *a new plan for remedying* an imaginary defect of my process; nor why the Director should call it *an improvement suggested to remedy a defect*," for in the "specification of my patent, I used the language, finally, the operations are terminated by cupelling the refined gold:" and that the aforesaid proposition of using muriatic acid was not one of mine.

Of Prof. Booth's experiments, in relation to which he offered a "historical view," in his report of the 13th ultimo, I saw fit, for reasons set forth in my letter to the Secretary, to remark: that he wrote to me on the 29th of June last, that his object was "not for the mint," but that he intended "to engage some friends in Philadelphia to carry out the refining on a large scale;" that the experiments upon my method, in July, 1850, "were improperly tried in the mint, in my absence, and without my concurrence or instructions; and that the imperfect results obtained should have been promptly communicated to me; but this was not done, until after Prof. Booth had evolved his new process, and had made application for letters patent therefor." And of his subsequent experiments with my method, I added: that he had "varied them as he alone saw fit, neither following the specification of my patent, nor heeding my views and wishes, expressed to himself." With this letter I also submitted to the Secretary copies of the several letters, which have passed between Prof. Booth and myself subsequently to December, 23d, 1850.

In his letter to me of January 23d, (see App. No. 55,) Prof. Booth suggested the expedieney of my coming to the mint, to learn "the position and state of things" orally, by "question and answer;" and observed, that: had I "called at the mint," on my "last passage through" Philadelphia, "probably much time might have been saved." In reply, on the 27th of January, (see App. No. 57), I observed: "that, without authority from the Treasury Department I could not, consistently with self-respect,

have gone to the mint to inquire into anything done under the direction and superintendence of the Director of the Mint; and that, if such were my views before, still more are they so since, the Director of the Mint has taken leave of, and treated as unnecessary the instructions given to him by the Secretary of the Treasury; an avoidance of orders which I could ascribe only to feelings of animosity to myself, as they were evidently both just and expedient." I also replied to what he had said, in his last letter, about my having been twice at the mint, in July last, without mentioning to him any way of toughening gold refined by zinc; and I made other remarks upon "the propriety of an authorized trial of both processes in my presence," and "the course of action pursued at the mint, since I communicated to the Director, in a letter of February 11th, 1850, the fact of my having discovered a new and very superior process of refining."

As the first experiments, made by the melter and refiner of the branch mint at New Orleans, Dr. M. F. Bonzano, upon refining gold by my method, had been tried upon quantities not exceeding forty ounces, in any single experiment, I requested him, in a telegraphic communication, to make a trial upon a much larger scale, and to toughen the gold in a black lead crucible. Which he accordingly did promptly; and on the 25th of January, reported to me, by telegraph, the successful result of an experiment upon 400 ounces of California gold, worth about $7,200; remarking, however, that: "a test furnace would be advantageous." (See App. No. 58). A copy of which report, I enclosed on the 29th ult., (see App. No. 59), with copies of the last two letters between Mr. Booth and myself, to the Secretary of the Treasury.

In view of the fact that the Director of the Mint had disregarded the instructions given to him by the Secretary of the Treasury, and of the consideration, that if the Secretary should repeat the order peremptorily, or take any other action thereon, he might be considered as acting under the influence of offended feeling, I felt unwilling to ask him to do more than he had already done. Nor would it have been any longer perfectly convenient for me to attend a trial of theaforesaid methods, to be made at the Mint, in my presence, if such an order had been again given, after the close of the vacation in the college with which I am connected.

Yet as important public interests are involved in this matter, and as I felt convinced that a proper regard for my own professional reputation, even more than for my pecuniary interests, demanded that I should not neglect any requisite

step which might lead to prompt and correct action thereupon, I felt it to be my duty to submit the subject in writing, on the 5th inst., to the immediate consideration of the President (see App. No. 61.) And, in my communication to him, after making a brief statement of the principal fact, I informed him: "that I have no confidenco that a fair trial of either invention will be made in the mint, by Prof. Booth alone: That I have good reason to believe the Director of the Mint to be influenced by hostility to me, incurred by reason of my having been obliged, by my sense of duty, as an officer of the mint, to decline to furnish facilities to the coiner for carrying on in the mint the business of manufacturing medals for his private gain, which I considered to be illegal and calculated, by example, to demoralize the persons employed in the mint, though sanctioned by the Director: And that, in view of the express contradictions and the conflicting statements, in which the Director and the Melter and Refiner of the Mint are involved, by their writings upon the subjects, mentioned in this communication, and of all the attending circumstances, I [was] painfully convinced, and [was] prompted by higher considerations than those of pecuniary interest, to inform [him] that a gross wrong has been committed upon me, by officers of the mint, to the great prejudice of the public economy and heavy loss to the depositers of bullion, entailed by their long adherence to an expensive and slow method of refining, in order, if possible, to substitute for my process the hitherto unsuccesful, though patented invention of one of themselves, in regard to which, the Director of the Mint, on the 5th of September last, urged upon the Commissioner of Patents prompt attention to the application for letters patent; in strange contrast with his perfect indifference to the offer contained in my unanswered letter to him of February 11th, 1850, and with his forebearance to express any opinion about, and declaration that both the officers of the mint and himself were ignorant of the merits of my process, in his reply of July 6th, to the Hon. W. M. Meredith, Secretary of the Treasury, taken in connexion with the abovementioned statements of Prof. Booth, concerning the information he had given to the Director; or, if said information was imparted subsequently to that reply, then with his having allowed it to remain, so far as I am informed and believe, without alteration or addition." And I asked of the President "only such action" as should consist with his "sense of justice, the rights of a citizen, and the public welfare, and that as early information thereof" might be given to me as his convenience should permit.

Having written to the President, as above, I addressed a letter to the Secretary of the Treasury, on the 5th inst., (see App. No. 62,) informing him of my having so done, "with a desire to be most courteous towards, and considerate of" himself. And in this letter, I also stated: that, as the process of Prof. Booth appears to be "a failure and, therefore, without value," it follows, as a consequence, that, under the enactment in the civil and diplomatic appropriation bill, the President could not use any part of the appropriation for the purchase of my invention, however efficient and valuable it shall be found to be, although he might give the whole sum for the process of a third person:" and, therefore, that, "whether legislation may not be necessary upon this subject, and should not be promptly applied for by me," was a question which I held "under consideration." I also enclosed a copy of the reply, (see App. No. 60), of Prof. Booth to my letter to him of the 27th inst., (see App. No. 57); in which reply, instead of giving me information concerning his process, he requested that our correspondence might cease, and that "any further communications in relation to the operations of the mint" might be made "through an official medium."

Since I made the above communication to the Secretary of the Treasury, I have received from him a copy of a report to him, from the Director of the Mint, (see App. No. 64) stating: "that an experiment on the parting process of Mr. McCulloh has been prosecuted to success so far as to prove that malleable gold may be procured by it." Of which I would say: that this was the first experiment tried in the Mint, at Philadelphia, by the use of the preferred means specified in my patent; and that prior to this successful experiment the only objection urged against my method was, that gold refined by it would be so brittle as to be unfit for coinage. But as this objection was no longer tenable, another equally futile and hypothetical was brought forward, and presented by the Director to the attention of the Secretary. In my letter acknowledging the receipt of the abovementioned copy of this report (see App. No, 65), I made such remarks as I deemed appropriate, and stated: that, "I have good reason to believe, and am now fully convinced, after a personal interview with Mr. Morfit," that the patented process of Messrs. Booth and Morfit, has "proved an utter failure, under the management of Prof. Booth himself, so that the union between us, by mutual assignment, recorded in the Patent Office, has in all probability been without valuable consideration on their part, and would, therefore, be

void in law and equity;" and that, "under such circumstances, legislation seems to be necessary to permit the right to use my process to be acquired by the Government; and a grave question, involving higher considerations than those of money, has to be disposed of, before any sale can be made."

In consideration of the aforesaid apparent necessity for legislation upon this matter by your honorable bodies, if, in your judgment, the public welfare, and the commercial interests of the country, require that the refining of the large quantities of California gold, received at the Mint, should be rapidly and economically done, by the use of a more efficient and cheap method of refining than that now employed for the purpose; in order that the depositors of bullion may be greatly benefitted by prompt payments in return for their deposites, and by the reduction of the charges now made to them for refining their bullion; and that the Treasury of the United States may be relieved from the expense of keeping in the mint so large a portion of the public monies, as is now used for the accommodation of said depositors, by advances made to them for their accommodation. Which expense has amounted, since September last, to four months interest on the $5,000,000, which has been, and is now, kept in the mint for that purpose; because this sum of five millions of dollars might, if not otherwise needed, have been employed for the redemption of the public debt, upon which the Government pays interest at the rate of five or six per cent per annum: And in view of the facts, presented in the above statements and substantiated by the accompanying Appendix, I would most respectfully request:

That you will investigate all that I have herein stated; and that you will authorize the President, if it be found that the invention of Prof. Booth is, as there is reason to believe it to be, destitute of value and efficiency, and that the assignment made by me to him is void, for want of value received in consideration thereof, to make with me, an equitable contract, for the right to use my improved method of refining gold, if he should deem it expedient to do so, in view of the public economy and the interests of the owners of bullion.

And in making this request, I consider it my duty to say to your honorable bodies, that any pecuniary profit which might possibly be derived from my invention, is to me a matter of far inferior consideration to the question of professional and personal

character, which is involved in what may have been, or shall be, done or said by me in relation to said invention.

All of which is most respectfully
submitted to your consideration by
RICHARD S. McCULLOH.

Princeton, February 24th, 1851.

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LIST OF EXHIBITS.

No. 1. October 24th, 1849. R. S. McCulloh appointed professor of Natural Philosophy in the College at Princeton.

2. October 25th, 1849. His resignation of the office of Melter and Refiner of the Mint.

3. October 26th, 1849. J. W. McCulloh writes that the Secretary of the Treasury is rejoiced to know that Prof. Booth will accept the office.

4. February 11th, 1850. To the Director of the Mint, announcing the discovery of a superior method for refining gold.

5. July 1st, 1850. To the Secretary of the Treasury, informing him of the importance of said discovery and offering any information upon the subject.

6. July 2d, 1850. The Secretary of the Treasury refers the subject to the Director of the Mint.

7. July 6th, 1850. The Director reports that he is ignorant of the process, and that no opinion can be properly given as to its merit or value until it shall been tried.

8. July 5th, 1850. Memorial to Congress in relation to said discovery, and its importance.

9. July 9th, 1850. From the Melter and Refiner of the Mint, Prof. J. C. Booth, offering his opinion of the great value of the method of R. S. McCulloh for refining with zinc; and stating that he had been working with it, believing himself to have invented it.

10. June 29th, 1850. From Prof. J. C. Booth, proposing to unite the process which he supposed to be his, with that of R. S. McCulloh, for private refining.

11. July 16th, 1850. To Prof. Booth, indicating the causes of any difficulty in refining with zinc, and requesting him not to use the process in the mint for other than experimental purposes.

12. July 29th, 1850. To Dr. R. M. Patterson, asking for an expression of his views and wishes in a private letter.

13. August 7th, 1850. J. C. Booth assigns to C. Morfit Esq., one fourth of an invention for refining gold, for which he has made application for letters patent.

14. August 13th, 1850. Prof. J. C. Booth, finds $100,000 of gold worked with zinc brittle, has no time to experiment with it, and with Mr. Morfit has been successfully seeking a process for refining on different principles.

15. August 16th, 1850. From Prof. Booth, he thinks competition will be detrimental to both parties, but cannot mention the nature of his process until permitted so to do by his counsel, H. M. Morfit, Esq.

16. August 24th, 1850. From Prof. Booth; he will see J. S. McCulloh Esq. in New York and go to Princeton. No need for hurry.

17. August 24th, 1850. From J. S. McCulloh, his interview with Prof. J. C. Booth.

18. August 30th, 1850. J. C. Booth, could not stop at Princeton, cannot

disclose without consent of the Messrs. Morfit, asks whether the method of R. S. McCulloh will be urged before Congress.

No. 19. September 4th, 1850. To Prof. J. C. Booth, Congress will act upon the aforesaid method, but nothing will be done inconsistent with the proposed equitable union of interests.

20. September 5th, 1850. The Director of the Mint to the Commissioner of Patents, urging prompt attention to Prof. Booth's application for a patent, as a measure of importance to the mint.

21. September 9th, 1850. H. M. Morfit, Esq., to the Secretary of the Treasury, offering to the United States the process for refining gold of Messrs. Booth and Morfit, and asking that the Director of the Mint may be instructed to examine and report upon the same.

22. September 12th, 1850. An assignment of one moiety of the invention of R. S. McCulloh to J. C. Booth, in consideration of his conveying to said McCulloh a moiety of his own.

23. September 21st, 1850. From J. C. Booth, stating that Dr. Patterson first hesitated, but afterwards wrote to the chairman of the Committee of Finance. The officers of the mint may throw impediments in the way; their prejudice; alterations in progress; proposes publication.

24. September 23d, 1850. To Prof. Booth; the examination of the new processes will have to be made satisfactorily to each party, and in pursuance of such directions as the Secretary of the Treasury may give, so that no impediments can be thrown in the way thereof. Request that he will use the large test furnace in the cellar in any trials he may make.

25. October 7th, 1850. From H. M. Morfit to J. W. McCulloh.

26. October 23d, 1850. From C. Morfit, Esq. His willingness to concur in any action of Prof. Booth, and desire that the $25,000 appropriated by Congress be accepted.

27. October 30th, 1850. From J. W. McCulloh; his interview with H. M. Morfit, Esq., in relation to a sale of the patented methods of Messrs. Booth and M'Culloh.

28, November 1st, 1850. From Prof. Booth; asks what shall be done when a report has been made by the Director of the Mint to the President and Secretary of the Treasury. His experiments progress slowly, by reason of increasing quantities of gold from California.

29. November 2, 1850. To Prof. Booth; nothing can properly be done or said in anticipation of any proposed report, or other official action, of the Director of the Mint.

30. November 8th, 1850. To Prof. Booth, asking whether H. M. Morfit, as his agent, is right in expressing unwillingness to sell the processes for $25,000.

31. November 11th, 1850. From Prof. Booth; says H. M. Morfit, Esq., has nothing to do with the acceptance or non-acceptance of the $25,000, and must have been misunderstood. The letter of C. Morfit, Esq., and his own assurance sufficient.

32. November 18th, 1850. To Prof. Booth, asking whether he proposes to sell both methods, or only one; also what experiments he has been trying, and what he has done with the $100,000 left unfinished in July.

33. November 21, 1850. From Prof. Booth, wishes to accept the government proposition, mentions publication of foreign processes, has conquered unanticipated difficulties, is trying an improvement, his own process not quite complete, each will work in a week.

No. 34. November 21st, 1850. To Prof. Booth, inquiring what are the foreign processes, repeating questions of the letter of Nov. 18th, and stating that no decision is necessary before the Secretary of the Treasury is prepared to act upon the matter.

35. November 25th, 1850. Prof. Booth mentions the nature of the foreign processes, morally bound to offer both methods to the government, has obtained toughened gold by both processes, and can work either of them on a large scale, will report in the course of the week, cannot let private duties prevent public, must enlarge the apparatus for the old method, which will lessen the necessity for a new process, wishes reciprocity of understanding.

36. November 26th, 1850. R. S. McCulloh, thinks the foreign processes worthless, glad to hear he can work *both* methods, under no moral obligation to sell the processes, will reciprocate explicitness, but not decide hastily nor before the government has ceased to be indifferent, no wish to interfere with his duties, questions the propriety of the course at the mint.

37. November 28th, 1850. C. Morfit, Esq., inquires about and urges a sale for the sum appropriated.

38. November 29th, 1850. Reply to C. Morfit, Esq., believes the Director of the Mint will report adversely, notwithstanding successful trials, and awaits his action.

39. December 3d, 1850. To Prof. Booth, informing him of said reply, and that the course of the mint in opposition to economy, and its hostility, will lead to retribution if continued.

40, December 5th, 1851. J. C. Booth apprehends no unfavorable report from the Director if his experiments prove favorable, obtained toughened gold with zinc only in a single experiment, with the last of the $100,000; his own process does not work well in the time for making solution; is experimenting every day; action would be premature until the processes have been shown to be successful.

41. December 10th, 1850. The melter and refiner of the branch mint at New Orleans, Dr. Bonzano, reports a successful trial of R. S. McC's method of refining, and remarks upon its great advantages.

42. December 23d, 1850. To the Secretary of the Treasury requesting that an immediate trial of the new methods of refining might be made in the presence of both parties.

43. December 23d, 1850, From Dr. Bonzano. Four successful trials of Mr. McC's method of refining made at the mint in New Orleans. No difficulty presented itself.

44. January 1st, 1851. Copy of the preceding letter submitted, with remarks, to the consideration of the Secretary of the Treasury.

45. January 3d, 1851. R. S. McCulloh requests Prof. Booth to report the results of his experiments,

46, January 4th, 1851. Prof. Booth cannot make a satisfactory report; is erecting a test furnace to try the process of Mr. McCulloh

47. January 10th, 1851. Cannot comprehend why Prof. Booth, should have been enlarging the apparatus of the old method, instead of establishing the superiority of his own, if it be what he stated it to be; calls upon him for information of any difficulties he may have met with; has foreborne to press his own method. A grave responsibility somewhere.

48. January 14, 1851. From Prof. Booth. It is wholly unnecessary to enter into detail in relation to difficulties met with; can report on both processes next week and favorably.

No. 49. January 16th, 1851. To the Secretary of the Treasury, asking copies of letters of the Director of the Mint, and of the replies thereto.

50. September 10th, 1850. Instructing the Director of the Mint to compare Mr. Booth's plan with any other used or known at the Mint, and to report thereon.

51. January 11th, 1851. Order to the Director of the Mint to test the method of refining gold patented by Prof. McCulloh, as well as that by Mr. Booth, with as little delay as possible and in the presence of both of said gentlemen, also to report when this can be done and the time it will require.

52. January 14th, 1851. Tho Director of the Mint reports that experiments have been unsuccessfully tried and are in progress; encloses a communication to him from Prof. Booth; argues that Mr. Booth has every inducement to try the methods properly; and reports that if no success has resulted, the cause is, not the lack of experiments, but the imperfection of the processes, and that an improvement, suggested to amend the defect of Mr. McC's process, is to be tried.

53. January 13th, 1851. Prof. Booth to the Director of the Mint, containing various statements about his unsuccessful experiments and other matters.

54. January 21st, 1851. R. S. McC. to Prof. Booth, stating that he has yet to learn from him why the erection of a test furnace should be necessary, unless the old furnace has been torn down; or why the proposed use of muriatic acid should be ascribed to himself; or why the use of a test furnace should be deemed a modification or improvement upon the process specified in his patent; that he would not expect the officers of the mint, to be satisfied of the superiority of his method, also that he cannot consider any reason sufficient for his being kept in ignorance of the difficulties met with by Mr. Booth in trying his own process.

55. January 23d, 1851. J. C. Booth invites Mr. McC. to come to the mint to learn from him orally about the difficulties met, with which he again declines to communicate by letter.

56. January 23d, 1851. To the Secretary of the Treasury, calling his attention to the fact that the Director of the mint had taken leave of his orders, to have a trial made in the presence of both parties; also stating that cupellation, being part of the process of Mr. McC. as described in the specification of his patent, is neither as represented by Mr. Booth, "a new plan for remedying," nor an improvement suggested to remedy a defect, as spoken of by the Director; with other remarks on the reports of those gentlemen.

57. January 27th, 1851. Reply to Prof. Booth; cannot go to the mint to inquire into what has been officially done by him, without authority so to do from the Treasury Department, consistently with self-respect, by reason of the personal hostility of the Director; &c. &c.

58. January 25th, 1851. A successful experiment upon refining and toughening 400 ounces of California gold, by Dr. Bonzano, tried in the mint of New Orleans, with Mr. McC's process.

59. Januory 29th, 1851. To the Secretary of the Treasury, informing him of said trial and enclosing copies of letters from and to Mr. Booth.

60. January 30th, 1851. Prof. Booth requests that correspondence may cease, and communications be made through an official medium.

61. February 5th, 1851. To the President, submitting the whole subject and requesting prompt attention to and action upon it.

62. February 5th, 1851. To the Secretary, informing him that in courtesy and consideration of himself, as his orders had been disregarded, the aforesaid communication had been made to the President, and that

as the process of Prof. Booth appears to be a failure, legislation may be necessary, and whether prompt application therefor should not be made, was a question held under consideration.

No. 63. February 12th, 1851. Copy of a report from the Director of the Mint. on Mr. McC.'s process furnished by the Treasury Department.

64. February 11th, 1851. The Director of the Mint reports to the Secretary of the Treasury that it has been proved that malleable gold may be procured by Mr. Mc.'s process, but proposes to make another trial to determine all particulars, and presents a new hypothetical objection.

65. February 14th, 1851. To the Secretary of the Treasury commenting upon the above report, and calling his attention particularly to the subject that the failure of the process of Mr. Booth appears to require legislation.

66. January 4th, 1851. To the Secretary of the Treasury, in relation to an official correspondence with the Director of the Mint, about the manufacture of medals in the mint, copy of which had been requested and furnished.

67. August 17th, 1849, To F. Peale, Esq., declining to furnish him with gold or silver for the manufacture of medals.

68. August 23d, 1849. To the Director of the Mint, stating reasons for so declining.

69. August 24th, 1849. Reply of the Director.

70. August 25th, 1849. To the Director, in reply to his remarks, and justification of the refusal to aid the Coiner in employing the facilities of the mint, for carrying on a business for his private profit.

APPENDIX.

No. 1.

PRINCETON, Oct. 24th, 1849.

PROF. RICHARD S. MCCULLOH,

RESPECTED SIR:—I have the pleasure to inform you, that at the meeting of the Board of Trustees of the College of New Jersey, they have this day unanimously elected you Professor of Natural Philosophy in this College, and it is earnestly desired by the Trustees in a very full meeting of the board, that you would comply with their request.

By order of the Board,

ELI F. COOLY, *Clerk.*

No. 2.

MINT OF THE UNITED STATES,
Melter and Refiner's Office,
Oct. 25th, 1849.

To His Excellency,

ZACHARY TAYLOR,

President of the United States.

SIR:—Having been elected Professor of Natural Philosophy in the College of New Jersey, at Princeton, I hereby resign the office of Melter and Refiner of the United States Mint,—this resignation to take effect as soon as it shall be found practicable for me to deliver to the Treasurer of the Mint all the bullion which may be in my hands, in suitable form and condition for the settlement of my account.

With the highest respect,

Your obedient servant,

R. S. McCULLOH.

No. 3.

WASHINGTON, 26th Oct., 1849.

DEAR RICHARD:

In conformity with your wishes, I have just handed to Mr. Meredith your resignation of the office of Melter and Refiner of the U. S. Mint, and as the best mode of expressing my own estimate of *the extraordinary fitness* of Professor Booth, for that office, I handed to Mr. Meredith the letter which you addressed to me on the subject; and I have the pleasure to inform you, that he is rejoiced to know that Prof. Booth would accept the office. He is gratified by the path pursued by you, in letting him know *directly* your resignation, and especially in connexion with the fact that Prof. Booth is willing to fill the vacancy, as it protects himself from numerous applications, that publicity would have caused to be made to him, whilst he was ascertaining whether Prof. Booth would accept the place—an inquiry that he would have early made if the *fact* had not been so acceptably communicated that he would. Of course, the mention of this subject should proceed from other persons than either of us, to any body—except by yourself, *confidentially*, to Profs. Patterson and Booth.

Mr. Meredith congratulates you upon your call to a post more congenial to your feelings, as it better favours your scientific pursuits, and wishes me to tell you so.

Affectionately Yours,

J. W. McCULLOH.

To RICHARD S. McCULLOH, U. S. Mint.

No. 4.

PRINCETON, Feb. 11th, 1850.

MY DEAR SIR:

I have discovered a new method of separating gold from silver, which possesses the following advantages:

1st. It requires little if any more than one half of the time, labour and expense (acid, &c.) of either the French sulphuric acid process, or the nitric acid process now used in the U. S. Mint.

2d. It operates *directly* upon the silver, and therefore gives you the free use of your silver bullion fund for silver coinage, &c.

3d. It does not require costly or platinum vessels, nor a high temperature.

4th. It will enable you to do *twice* the amount of work, with your present force and arrangements.

By the advice of my friends I shall patent this new process, and I make this communication to you to the end that, if you see fit, the right to use it may be purchased for the mints of the United States.

The *exact* proportion of *expense* between this new method and those now employed, can be determined only by large working results; but from the data of small experiments, and the consequences which flow from chemical equivalents, I am confident the ratio will be about one half.

Very respectfully, your obedient servant,
RICHARD S. McCULLOH.

DR. R. M. PATTERSON,
Director U. S. Mint.

No. 5.

WASHINGTON, July 1st, 1850.

SIR:—I have discovered a new, quick, and economical method of refining argentiferous and other gold bullion, whereby the work may be done in one half the present time, and a large saving effected in interest upon the amount which is currently refined and withdrawn, for that purpose, from the use of the depositor, or from the Treasury by advances for his accommodation, —this amount being now between one and a half and two millions of dollars, held chiefly for that object in the Mint, and the greater part of which might be released.

In labour and materials this new method would also save about one half of the cost required by the process now used in the Mint of the United States; so that the charge to depositors for refining, which now is, as by law directed, fixed at the actual cost thereof may be considerably reduced.

The apparatus required is less costly and more compact than that used in either of the methods now employed. The advantages in respect to space are such that probably five times as much work, as at present, may be done in the same building. In the Mint at Philadelphia, ten millions of dollars per month may be refined, and the sum of $1000 would, I believe, cover the cost of the alterations and apparatus required.

This communication is made to you to the end that the U. S.

Government may acquire, for an equitable consideration, the advantages to be derived from the use in the Mint and its branches, of this new chemical invention or discovery, which I have taken steps to secure by letters patent both in this country and in Europe.

If you desire any further information upon this subject, I will be happy to furnish it to you.

Very respectfully, your obedient servant

RICHARD S. McCULLOH.

Hon. W. M. Meredith,
Secretary of the Treasury.

No. 6.

Treasury Department,
July 2, 1850.

Sir:—The enclosed communication received from R. McCulloh, Esq., is submitted for your perusal and for your views in relation to the discovery to which it relates.

I am very respectfully,

W. M. MEREDITH,
Secretary of the Treasury.

Dr. R. M. Patterson,
Director of the Mint, Phila.

No. 7.

Mint of the United States.
Philadelphia July 6, 1850.

Sir:

I have the honour to acknowledge the receipt of your letter of the 2d inst., in which you ask my views in relation to a discovery made by Prof. Richard S. McCulloh, of a new process for parting gold and silver.

I have in answer to say that I am in ignorance of the process referred to by Mr. McCulloh. I know that he has been engaged in a method of improving the parting process; but

neither I, nor any officer of the mint, has been made acquainted with the results.

Until the process shall be fully made known to us, and tried upon a large scale, no opinion can be properly given as to the merit and the value of Mr. McCulloh's discovery.

Very respectfully
Your faithful Servant,
R. M. PATTERSON.
Director.

HON. WM. M. MEREDITH,
Secretary of the Treasury.

No. 8.

MEMORIAL.

To the Honorable the Senate and House of Representatives in Congress assembled:

The undersigned memorialist, Richard S. McCulloh, late melter and refiner of the mint of the United States at Philadelphia, now professor of natural philosophy in the College of New Jersey, at Princeton, respectfully states:

1st. That he has discovered a new, quick and economical method of separating silver and other impurities from gold, and has secured to himself and his assigns the exclusive right to use said method in the United States, by his having duly entered a caveat, and confidentially filed a specification, to obtain for said discovery letters patent of the United States, that will be issued to him as soon as patents, for which applications have been sent by him to England, France, Russia, &c., shall have been secured, as they soon will be.

2d. That, by this new method, parcels of gold bullion worth from one to two millions of dollars each can be as quickly refined as parcels worth but one or two hundred thousand dollars now are.

3d. That, by using this method, an indefinite series of large deposites of gold bullion can be refined in one-half the time required for the operations of the method hitherto employed at the mint of the United States.

4th. That six operations, each of the full capacity of the refining apparatus employed, may be commenced and readily finished every week by this new method; whereas but three

such operations per week can be so accomplished by the method of refining gold now used in the mint and its branches.

5th. That the refining capacity of the apparatus of the mint at Philadelphia was about $100,000 per month prior to July 1, 1849; when your memorialist proceeded to construct and substitute other apparatus, worked by steam, upon a new and original plan, under authority then given to, and responsibility devolved upon him, by the Director of said mint. The refining capacity was extended to $1,500,000 by this apparatus; and it was executed with unusual despatch, having been pushed to completion by machinists working at all hours, during the prevalence of epidemic cholera, and of course at extra prices—also, without interruption of the refining work, which by aid of temporary contrivances, was driven day and night, in unprecedented quantity, to reduce the heavy accumulation of bullion.

6th. That, during the first month of the regular employment of said apparatus, October, 1849, the whole expense of its construction was more than compensated by interest saved to depositors on the amount of bullion refined, and so promptly released from long detention—said expense having been about $6,500, including the cost of large iron water tanks, &c., placed beneath the roof and rendered necessary by the failure of the city works to supply water, except at night; and also including the cost of heavy iron braces, used to strengthen and secure the carpentry work of that part of the building.

7th. That, by the expenditure of about $1,000 more upon this apparatus, which has been somewhat enlarged and improved by his successor in office, it might now be so modified as to adapt it to the aforesaid new method of refining gold, and to extend the refining capacity to ten millions of dollars per month, if that method be used at said mint.

8th. That the quickness with which each one of an indefinite series of gold deposites of any probable magnitude may be refined by the aforesaid new method and modified apparatus would, if they were employed, prevent its being often, if ever, necessary for the President of the United States to direct transfers of public money to be made to the mint or its branches, under the act of Congress approved May 23, 1850, to pay for gold deposites made therein before the same shall have been, or can be, refined; for the deposite of one million of dollars, which the Secretary of the Treasury is authorized, by the 31st section of the act of Congress approved January 18, 1837, to keep in said mint and its branches, for the purpose of paying the value of such bullion to the depositors thereof, with as little delay as

possible after that value has been ascertained, would ordinarily be found more than sufficient for the purpose.

9th. That it appears from the Treasurer's last published statement of the amounts of public money at his credit in different depositeries, computed from returns received to the 24th ultimo, that the aggregate of those in the mint and its branches was $2,500,000—being $1,500,000 in addition to the sum of one million of dollars authorized to be advanced, by order of the Secretary of the Treasury, under the aforesaid act of January, 1837. Which additional sum of $1,500,000 has undoubtedly been necessarily directed by the President of the United States to be transferred to the mint, under the aforesaid act of May 23, 1850, by reason chiefly of the time required by the process used at the mint for refining gold. And which money is provided by the government, to be advanced to the depositors of gold bullion at an expense to the treasury fully equal to interest thereon at the rate of five or six per cent, per annum; because the United States are indebted for many millions of dollars borrowed upon interest at said rates, which is constantly accruing and being paid semi-annually; and because the aforesaid acts of January, 1837, and May, 1850, expressly direct that discount or interest shall not be charged to depositors of bullion on the value thereof, advanced to them as soon as the same can be ascertained, and before it can be refined.

10th. That this new method renders the work of the refiner of gold more simple, less dependent upon his close and constant attention, and neither injurious to his health, nor offensive to others when conducted in cities.

11th. That the cost of labor and materials required for refining any parcel of gold bullion, if this new method shall be used at the mint of the United States, will not exceed one-half of the cost of labor and materials required by the method now employed therein.

12th. Finally, that he has made the fact known to the Director of the mint and the Secretary of the Treasury that he had discovered a new method of refining gold, which might be advantageously used in the mint of the United States and its branches; but, as the legislative department of the government alone has the power to secure for the general benefit of the citizens of the Union the right to use said discovery in the mint and its branches, for a valuable consideration, which may be either a just sum in gross or a fair share of the saving in labor and materials that shall be effected by the use thereof, therefore he has deemed it to be most proper that he should

make the foregoing statement directly to your honorable bodies, and announce his willingness to grant, for such consideration, the right to use his aforesaid discovery in the mint of the United States and its branches.

All of which is most respectfully submitted to your consideration, by

RICHARD S. McCULLOH.

WASHINGTON, *July* 5th, 1850.

No. 9.

PHILADELPHIA, July 9th 1850.

DEAR McCULLOH:

I have every reason to believe now that the process which you have patented I have been pursuing for the past few weeks. I wrote to you on the subject some 10 days ago to Princeton, but have since learned that you were in Washington, not knowing that you had completed your process I made a proposition to unite the two together. I have worked a few hundred pounds of gold with zinc in various ways and think that the cost may be reduced to a very low rate. My main object in writing now is to advise you to guard your patent on one point where it might be interfered with. A cheaper metal iron may be substituted wholly or in part for the zinc. I have tried several experiments to this effect and although it is difficult to bring them easily into alloy, yet I know it can be done, and your patent might be interfered with. At all events, do you not think it well to guard against such an encroachment. Dr. Patterson showed me the Secretary's letter in relation to your communication. I told him that I supposed I knew what the patent was, and that I had been working with it for some time. He supposed you would ask a large sum for it. I told him I thought it worth it, and that if it were my patent I would value it very high, say $50,000 in the U. S. or possibly double that amount. I think perhaps you would have done better to have formed a company for refining gold, although by your present course you save yourself much trouble and annoyance.

I wish you all success in your patent both at home and abroad, and if I can assist you in an opinion, I will do with much pleasure. I can give a full opinion on it, for I have worked it all out in detail on large quantities of metal. You may

imagine how elated I was when I first planned and executed it, and how sadly depressed I was to find myself as I believed No. 2. However I have made the acquaintance of *John Jones* before now, and can shake hands with him again.

Yours Truly,
JAMES C. BOOTH.

PROF. R. S. MCCULLOH.
Washington, D. C.

No. 10.

PHILADELPHIA, 29th June, 1850.

DEAR MCCULLOH:

Your order for fifty instruments went off, and I thought it unnecessary for you to write in the same, for you can order at any time, through the same channel, with or without my help. I begged Greiner to let me know as soon as he received my order so that we might know of the certainty of his having received it; but you know he is no merchant and may think it unnecessary to write, as he has heretofore done, much to my annoyance.

My principal object in writing is to tell you that I have been experimenting a good deal to find out new methods of refining the California gold, and have succeeded in part by the use of zinc, but there are some difficulties yet to be overcome in its use on a large scale, although I am using it now, which requires still further experiment. I have brought the cost down to about one half of our present plan, but believe that it may be produced still cheaper. As I do not know your plan, nor the cost of carrying it out, I wish to ascertain whether we can unite our processes, so as to be mutually beneficial.

I have just worked off a large lot of gold by my process, and find it works with tolerable facility. I have not yet examined the records to ascertain whether it is new or not.

Yours truly,
JAS. C. BOOTH.

Professor R. S. MCCULLOH,
Princeton, N. J.

My object is not for the mint, but I intend to engage some friends here in Philadelphia to carry out the refining on a large scale.

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No. 11.

PRINCETON, July 16, 1850.

MY DEAR BOOTH:

On reaching home, I found the letter which you had written to me in my absence, informing me that you had ordered hydrometers for me from Germany (for which favor I am much obliged to you); and also of your experiments with zinc, &c., your idea of uniting with me, forming a company, &c.

In your letter addressed to me at Washington, you refer to a "difficulty" which I presume to be the brittleness of which you spoke to me. That brittleness gave me some trouble at first, and led me to make investigations by which, *upon a small scale*, I have succeeded perfectly. I am also confident that I can do the same with *entire ease upon any scale*, though I have not possessed the facilities to make a trial; and I can assure you that I have examined every step most carefully and thoroughly.

To avoid brittleness, not only must the lead contained in spelter be guarded against, but another fact must be attended to, which as it is of interest itself I will mention. If an alloy of zinc with *any* of the fixed metals be subjected to a high heat, the zinc will not be *wholly* volatilized, nor will acids remove it entirely; traces varying in quantity with the temperature or strength of acid, are retained with powerful affinity, so strongly indeed that the last portions of zinc volatilized carry off a considerable quantity of the fixed metal. With silver this effect is very marked. Upon the sheet iron hood or funnel, used in the mint for granulating, the oxidized crust of zinc contains silver, in large proportion, &c., &c.

I will only add that I have perfected my process and a plan of apparatus for it in every particular.

Whether or not it would be more profitable to sell to the Government or to private capitalists, I do not know. I am under no obligations, and would not hesitate to make any arrangement which should appear advantageous. Any suggestions from you. I should be happy to receive and would consider fairly. And if you have friends who were about to form a company with you for refining, it may be that something of the sort might yet be done; and any communications to me would be held to be confidential.

It is necessary to my interests abroad to keep my application here still in caveat or secret. And as *any* disclosure, if published, would prevent my getting a patent in England, I must ask that you will be very guarded in conversing about any process for the present.

Also, I repeat my request that you will *not use* the method as a *process for actual refining*. But experiments, which cannot invalidate my rights, you of course can freely try. And their comparative results, whether confirmatory or otherwise, of my own upon a smaller scale, cannot fail to be interesting to me.

Yours very truly,

R. S. McCULLOH.

Prof. J. C. Booth,
U. S. Mint.

P. S. I should add that I have already held intercourse with some of the most wealthy New York capitalists, who would like to obtain for their city the exclusive use of my patent, but I have had no understanding with them yet, preferring first to offer the method to the Government.

No. 12.

[Private.] WASHINGTON, July 29, 1853.

MY DEAR SIR:

Upon reflection after leaving you, I concluded not to seek from you any communication in relation to my method of refining gold to be shown by me to members of Congress.

Such a mode of proceeding might to some seem irregular and therefore be prejudicial.

Your views and wishes in a *private letter* I should still be happy to receive, that I may know them and endeavor to conform my action therewith.

Very truly Yours,

R. S. McCULLOH.

Dr. R. M. PATTERSON.

No. 13.

This instrument, made by James C. Booth of Philadelphia, now in Washington City witnesseth: that, whereas he is the inventor of a new method for refining gold and separating it from other metals, and has drawn his application for a patent

therefor from the United States, under date of the 5th of August 1850, the date of the oath upon which is of the 7th of August 1850:

And whereas Campbell Morfit, chemist of Philadelphia, has assisted him in the processes concerning the same:

Therefore, this assignment witnesseth: that for and in consideration of the premises, and also of the sum of five dollars current money in hand, paid to the said James C. Booth by the said Campbell Morfit, before the delivery of these presents, the receipt whereof is hereby acknowledged by the said James C. Booth, he the said James C. Booth hath assigned, transferred, bargained, sold and set over, and by these presents doth bargain, sell, assign, transfer and set over unto him, the said Campbell Morfit, his executors, administrators and assigns, one fourth part, share, right, title and interest in and to the said invention and the benefits and profits thereof, and also of the patent right for the same when it shall be issued, and all modifications, improvements, and renewals of the said invention and patent for and during the whole period and periods and duration thereof, and for and throughout the whole United States of America and elsewhere.

To have and to hold the same and all the property, profit, benefits, right and title in and to the same to the extent of the undivided one-fourth part of the said invention, patent right, when issued, and all improvements, modifications and renewals thereof unto him the said Campbell Morfit, his executors, administrators and assigns for his and their sole and exclusive use, benefit and behoof.

In testimony whereof the said James C. Booth hath hereunto set his hand and seal this the seventh day of August, eighteen hundred and fifty.

JAMES C. BOOTH, [seal.]

Signed, sealed, delivered and acknowledged before }
JAMES F. JONCHERIS, W. THOMPSON.

District of Columbia, Washington County, to wit: Be it known that on this the seventh day of August in the year eighteen hundred and fifty, before the subscriber, a Justice of the Peace in and for the county aforesaid, personally appeared James C. Booth of Philadelphia, the party grantor of the foregoing assignment, and acknowledged the same to be his act and deed for the purposes therein mentioned, taken and certified by

W. THOMPSON, [J. P.]

Received and Recorded, Aug. 8, 1850.

No. 14.

PHILADELPHIA, 13 Aug. 1850.

DEAR MCCULLOH:

I have just received a letter from Greiner dated 13th July, stating that he had received your order for "fifty hydrometers in cases with cylinders," which he would be able to finish by the close of September, 1850.

I was delighted with the zinc process as soon as I had conceived and carried out the principle, not dreaming of any trouble subsequently; but after melting up $100,000 of gold with zinc, and having worked off part of it, by dilute sulphuric and then, after washing, by nitric acid, it has proved so brittle after melting, that I am at a loss what to do with it. I have not made many experiments on the gold, it is true, nor have I time to do it. I was so disappointed in this result that Morfit and myself have been working out another process of refining on different principles. I believe it will be very successful.

Yours truly,
JAS. C. BOOTH.

Prof. R. S. MCCULLOH,
Princeton, New Jersey.

No. 15.

NEW YORK, 16th August, 1850.

DEAR MCCULLOH:

I received your favour of 14th yesterday morning in Philadelphia, and left at 5 o'clock for New York, where I shall remain for some ten days. I am very anxious to see you on the subject of refining gold, as I think it would be to the detriment of both parties to compete on the merits of their respective processes. I cannot mention the nature of my process until I receive permission so to do from my lawyer Mr. Morfit; but this much I will say, that it is entirely different from either of the plans you have proposed. It is a plan which I desired to carry out before I entered the mint, and mentioned to John Monell soon after my appointment; but there were serious objections in the way of its use, which I could not obviate. These I have now entirely obviated, and rendered the process short, easy of execution, safe from loss of gold or silver, and the cheapest yet

devised. The materials cost about one-half of those in your process with zinc, and one-fourth of those used at the mint. The other costs will be about the same as in your process. You will therefore see that our processes are so nearly on a par, that it will be for our mutual benefit not to compete. I do not intend pushing the matter until I return to Philadelphia.

I shall remain here ten days more or less, and if you wish to write, or if in New York to see me, you will find me through the firm of Faber & Bierwirth, New St., below Exchange Place, N. Y.

Yours truly,

JAS. C. BOOTH.

Prof. R. S. McCulloh,
Princeton, N. J.

No. 16.

Glencove, L. I., 22d Aug. '50.

Dear McC:

I received your favour of 17th inst., on the 20th, at this place, where I am spending a few days with the family of my brother-in-law, Mr. Faber, to recruit for the coming season.

I will endeavour to see your brother in New York, in a day or two, and if possible call upon you in Princeton, unless my intended absence from Philadelphia should be rendered shorter by some unforeseen occurrence, or by positive orders to return. Should I not however be able to accomplish this, I will go up to Princeton from Philadelphia. There need be no great hurry in the matter, for Congress will scarcely do any thing for it at this session.

I am making an enormous profit of my short stay here by unwearied activity in rowing, sailing, bowling, &c. It is a delightful place for salt bathing, backed by a fine hilly country.

Very truly yours,

JAS. C. BOOTH.

Prof. R. S. McCulloh,
Princeton, N. J.

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No. 17.

August 24, 1850.

Dear Richard:

I got your note to-day and one from father to you. I think that your own and Booth's process are nearly equal in expense from what I learned from him to-day; he tells me he has entire control of his own process and patent and seems to contemplate some equality such as your having one fourth or one third of his and he one fourth or one third of your patent right.

He tells me he does not go on any *disintegrating* plan. I spoke of antimony and he did not seem to have this idea or any involving sublimation.

He seems to be fairly inclined in the matter and has to-day spent some hours talking with me, but said he could not till Morfit allowed him speak of his plan to any one.

I said to Booth that you could probably much reduce the cost of your process by a little practical working at the mint, which would of course have to be gone through with before the government would conclude any contract based upon checked results of working.

Booth will stop to see you on his way home, say about Tuesday night and will be in N. Y. till then. I am to see him again before he leaves at some fit moment.

He went to see Pratt & Brother to-day but result I know not: he thinks they might probably take it up, although the old silver process is to them in their line in supplying the goldsmiths here.

Affectionately
JOHN S. McCULLOH.

Prof. R. S. McCulloh,
Princeton, N. J.

No. 18.

Philad'a, 30th Aug. 1850.

Dear McCulloh:

As usual I was so hurried by business awaiting me here, that I could not stop at Princeton by the way, and must try to leave here for a day to see you. I have not yet heard from Mr. Morfit at Washington, nor can I act until I have his connivance.

together with that of Campbell Morfit, who is interested with me in the Patent.

I shall be able to write you more decisively when he writes. I suppose, however, that it is not necessary, unless your Patent will come before Congress at this session. Do you intend urging it at this time?

Yours, truly,

JAS. C. BOOTH.

Prof R. S. McCulloh,
Princeton, New Jersey.

No. 19.

Washington, Sept. 4, 1850.

My Dear Sir:

Your letter of August 30th was received just at the time of my departure from Princeton, on Monday morning.

I regret that you did not come to Princeton, that I might have had full opportunity of conferring with you.

You are aware that in July I memorialized Congress on the subject of my method of refining gold. That memorial was referred to the proper committees, who will certainly act upon it at the present session.

In their opinions, as well as in that of the commercial public, the embarrassment arising from the large amounts of California gold constantly arriving, render it imperative upon the Government to do every thing which can be done, to facilitate the prompt coinage thereof, and delays are justly considered highly injurious to the trade of the country as well as to the Treasury.

Under such circumstances my memorial has been regarded as very important and as all I have asked or desired is that Congress will empower the Secretary of the Treasury to make an equitable contract for the right to use my method, said contract to be based upon trial made and value determined, by the Director of the Mint, no serious objection has been entertained or difficulty interposed.

In view of your recent discovery, I shall introduce words (they may be few) into the clause authorizing the Secretary to contract, which will embrace your or any other improvements if united with mine. If power be given to contract with R. S. McC. and associates, (to wit yourself or others) for my method

and any improvements thereon, or other improvements in the art of refining gold, which may have been or shall be discovered and patented to said McC. or his associates, (or other equivalent words,) it will not be necessary for the Messrs. Morfit and yourself to go to Congress independently, as contract for our joint interests may be made under the power granted in view of my memorial. This would relieve you and them of much trouble. You may rest assured that I will do nothing inconsistent with our proposed equitable union of interests but every thing conducive thereto.

Yours truly,

R. S. McCULLOH.

Prof. J. C. Booth.

No. 20.

MINT OF THE UNITED STATES,
Sept 5th, 1850.

SIR :—I am informed by Prof. J. C. Booth, at present Melter and Refiner of the Mint, that he has discovered a novel, economical and expeditious method of separating mixed gold and silver, and that he has made application to your office for the issue of a patent therefor. It has been suggested to me that this application would be more promptly acted upon if it was thought that the interests of the Mint would be promoted thereby. I, therefore take the liberty of mentioning that we are at present engaged in enlarging and improving our separating department; our plans, however, being based entirely upon the method already in use. A better method, by which I mean one which shall be as practicable, and at the same time cheaper and more expeditious, it is of course our interest to introduce; and it is especially desirable that its introduction should not be postponed till after our new arrangements shall have been completed. Having great confidence in Mr. Booth's candor and judgment, I am disposed to believe that his proposed method has advantages over the present; but until his patent is secured we have not the opportunity of judging by experiments on a suitable scale, how far this may be the case. I trust, therefore, that you may feel justified in expediting such an examination, in your of-

fice, as will secure him the right of freely developing his plans. so that we may form a judgment of their merit.

Very respectfully, yours, &c.,

R. M. PATTERSON,

Director.

THOMAS EWBANK, ESQ.

No. 21.

WASHINGTON, Sept. 9th, 1850.

TO THE HON. THOMAS CORWIN,

Secretary of the Treasury.

SIR:—James C. Booth and Campbell Morfit, chemists of Philadelphia, are the proprietors of an invention for refining gold upon a new and economical plan, and I am authorized to offer the use of it to the United States for their present mints and any that may be established in California upon terms of great advantage to the Government.

The present cost of refining gold at the mint is $1500 per million. By this way all that may be saved: thus, if 20 millions are refined per annum, the saving will be $30,000: if 30 millions, the saving will be $45,000; and so on in the same ratio.

As the great influx of gold from California renders it indispensable that some more expeditious way of refining than that now followed at the mint should be introduced, the present plan which besides its economy extends the power of operation within the same limits greatly beyond that under the known mode, will answer in a cheap form all the demands that are likely to come from any sources.

The cost to the government for refining is 5½ cents per oz. The seigneurage now charged to depositors is 5 cts., producing a loss to the mint of ½ ct.

By the present process, silver is used to so large an extent that the average amount necessary to be kept on hand is about $100,000. By the new invention no silver is required, so that the whole of the interest upon the above sum would be saved, besides the loss incident to the constant chemical action on the silver. The present capabilities at the United States mint at Philadelphia do not permit more than two and a half millions of gold to be refined per month; while upon the proposed

plan four times as much or ten millions can be refined in the same space and time.

In this particular alone the new method would augment the capacities of the mint four fold, and thus without costs, put down all objections arising from delay attendant upon the old mode.

Another great advantage is that no ingredient is employed in the process to change the malleableness of the gold, or in any degree render it brittle or impair its natural ductility.

The advantages of the new plan are:

1st. That it is expeditious, so that any amount of gold brought from California or elsewhere can be refined *in the present* mint buildings.

2d. It is safe; so that no more material can be lost in refining than by the present or any of *the best* processes known; and less than by many other modes.

3d. It is a convenient way both as regards the apparatus and materials. The latter are among the most abundant in commerce and are everywhere to be obtained.

The apparatus is of the simplest kind, as wooden vessels can be used in the operation, and only a moderate heat is required.

4th. It is easily executed by operatives, and they are subject to little or no noxious vapours from the materials employed.

5th. In consequence of a smaller amount of offensive vapours being evolved by this process than through any other, it can be securely conducted in densely populated places.

6th. The separation of gold and silver is more effectual by it than by any other, for all the silver may be extracted from the gold if required.

7th. By the use of it the large quantity of silver now kept in the mint for refining gold, at the cost of the United States, will be saved, and that amount be allowed to be thrown into circulation.

8th. It is the cheapest process known by far; for the apparatus required is of the simplest kind, and the materials abundant and of low prices.

The cost of these materials is less than one cent per ounce of gold to be refined: whereas the cost to the mint by the present mode is about four cents per oz. for materials.

By this difference of cost, if 30 millions are refined per annum, the Government will save forty-five or fifty thousand dollars in that time.

9th. It requires less labour than the present process, for a large portion is spent upon melting, handling and recovering the silver now used: this labour is dispensed with as regards the silver, as that metal is not employed in the new method.

10th. It is better adapted to all the mints now established, or which may be established, than any other process; because the apparatus is easily constructed in any place, the materials are less bulky and more conveniently transported, and it requires the smallest quantity of acid.

It is for these and for other reasons the best yet devised for refining in *California* or the interior of a country.

As the ordinary fund of the mint at Philadelphia derived from coining is quite sufficient for the purpose, I would suggest, that the Government should purchase out the right to use the invention at that office for a stipulated sum to be agreed upon *after the Director shall have satisfied himself experimentally of the utility, economy, and value of the improvement.*

The same course could be adopted in relation to mints elsewhere.

The whole invention would be offered now in a gross sum, but to disembarrass the Department upon the question of the *entire* right, I prefer to propose the use of it as it may be wanted, and the estimate of the value according to its usefulness and effect can be easily ascertained between the Director of the Mint and the proprietors, subject to the concurrence of the Secretary.

The plan now presented does not seek to withdraw any money from the Treasury, but on the contrary to convert an expense into a profit, and to produce a revenue from a new source.

Indeed, so certain are the proprietors as to the saving of this process to the Mint, that they are willing to receive their payment for the use of the invention, *out of the very fund which that saving will create.* In this way the proprietors become the underwriters or insurers of their compensation, and if nothing is saved nothing will be paid.

The foregoing statement is intended to show that the refining can be done at much less than the cost now charged for that duty.

The 18th section of the Act of Congress of the 18th January, 1837, seems therefore to make it imperative upon the Director of the Mint, with the concurrence of the Secretary of the Treasury, to change the present mode, as it is expressly enacted, that the rate of charges for refining shall not exceed the actual expense of the materials and labour employed in such cases.

It is for this reason that the Secretary is now applied to; for as the law directs that the charges shall be altered from time to time, it contemplates a probability that there would be a good cause for a change, and makes it obligatory that it should take place when the cost of labor and materials could be reduced, as they may be by the new method.

In order to test the practicability, economy and usefulness of the proposed plan, I respectfully request that instructions may be given to the Director of the Mint at Philadelphia, to compare it in *all results* with any other used or known at that office for refining gold, and to report to you the particulars of that comparison as well as value of the process to that office.

Respectfully,

Your ob't serv't,

(Signed,) HENRY M. MORFIT,
for JAMES C. BOOTH and
CAMPBELL MORFIT,
Proprietors.

No. 22.

Whereas Richard S. McCulloh of Princeton is the inventor of a new and improved method for refining gold, and James C. Booth of Philadelphia is also the inventor of another new and useful improvement for the same purpose, and both of them have applied for Letters therefor from the United States; and whereas Campbell Morfit of Philadelphia has an interest in the said invention of said Booth and assents for value received to the act herein expressed and done by the said Booth; and whereas Sam. F. Butterworth of New York has an interest in the said invention of said McCulloh and assents for value received to the act herein expressed and done by the said McCulloh: and the said Richard S. McCulloh and James C. Booth being desirous to make an equal exchange in said improvements and the respective patents that may issue therefor and all renewals thereof, and in all other and further improvements that during the continuance of the terms of such patent rights may be made in the said inventions by either of them.

Therefore, in consideration of the premises and also of the exchange of one full moiety by said James C. Booth of his said invention with said Richard S. McCulloh as hereinafter made for the full one moiety of the said invention of said McCulloh to said Booth, he the said Richard S. McCulloh hath bargained, sold, assigned, transferred and set over, and doth hereby bargain, sell, transfer and set over unto him the said James C. Booth, his executors, administrators and assigns the full undivided one moiety or half part of his the said McCulloh's invention or improvement

for refining gold, in and for the United States of America, and in the patent therefor, when it shall be issued, for and during the term and existence of such patent and of all renewals thereof together with the right to the extent of said moiety of all and singular the improvements that from time to time may be made by the said McCulloh in said invention, or other improvements or inventions for refining of gold. To have and to hold the said full one undivided half or moiety of said invention, patent rights, renewals thereof and improvements in and throughout the United States unto him the said James C. Booth his executors, administrators and assigns. And the said James C. Booth, for and in consideration of the premises and also the exchange of the full one moiety of said invention and conveyance thereof to him as above by the said Richard S. McCulloh hath bargained, sold, assigned and transferred and set over, and doth hereby bargain, sell, assign, transfer and set over to him the said Richard S. McCulloh, his executors, administrators and assigns the full undivided one moiety or half part of his said James C. Booth's invention or improvement for refining gold, in and for the United States of America, and in the patent therefor, when it shall be issued, for and during the term and existence of such patent and of all renewals thereof, together with the right to the extent of said moiety of all and singular the improvements that from time to time may be made by the said James C. Booth in said invention or other improvements or inventions for refining gold. To have and to hold the said full one undivided half or moiety of said invention, patent rights, renewals thereof and improvements in and through the United States unto him the said Richard S. McCulloh his executors, administrators and assigns.

And the said Campbell Morfit and Sam. F. Butterworth for value received respectively assent to the foregoing exchange.

In Testimony whereof, the said Richard S. McCulloh, James C. Booth, Campbell Morfit and Sam. F. Butterworth have hereunto set their hands and seals this day the twelfth of September in the year eighteen hundred and fifty. The words " or other improvements or inventions for refining of gold" over the third line of the second page having been first interlined before signing.

Witness.	RICHD. S. McCULLOH.	[seal.]
JOURDAN W. MAURY,	JAS. C. BOOTH,	[seal.]
B. K. MORSELL,	CAMPBELL MORFIT,	[seal.]
	SAM. F. BUTTERWORTH.	[seal.]

District of Columbia
Washington county, } to wit:

Be it known that on this twelfth day of September, Eighteen hundred and fifty, before the subscriber a Justice of the Peace, in and for the county aforesaid, personally appeared Richard S. McCulloh, James C. Booth, Campbell Morfit and Sam. F. Butterworth, parties to the foregoing instrument and whom I certify were satisfactorily made known to me as the persons who executed the same, and severally acknowledged the same to be their act and deed.

Witness my hand and seal
B. K. MORSELL, [seal.]
12th September, 1850. J. P.
Rec. 13 Sept. 1850.

No. 23.

PHILADELPHIA, 21 Sept. 1850.

DEAR MCCULLOH:

When I first mentioned the subject of writing to Dr. P., he rather objected it, and on what at first sight might seem a sufficient ground, viz. that to state to the Chairman Com. Finance that a better process for refining was desirable, if we could get one, was to state a truism; for it must strike every one that a better process in any operation whatsoever is desirable. He did however write, but I did not see the letter. I have been preparing during the week to try our processes at all events before the officers of the mint, as they are desirous to see them carried out, and if they are better than the present process, to adopt them or one of them. They will evidently throw no impediment in the way, unless it be as to the manner of determining the cost of the present and the new processes. I believe the Dr. would not like to have compensation based upon contingencies, but still I apprehend no serious difficulty on this point. I am afraid you may think that some of the officers entertain a more serious prejudice against you than they really do, from what I said to you to induce you not to write to P. I know very well that the Dr. does not like to do any thing unless officially required, lest he should give umbrage to others, and this feeling may induce him to be backward in relation to patents for processes, but if officially required, I think he would give a

ready and honest reply on any subject connected with the mint.

Suppose now that the bill passes finally, and the Secretary of the Treasury is ready to contract with us. He must first be satisfied in relation to the quality of each process, and the information will of course come from the mint. I am therefore urging forward the alterations commenced when I left for Washington, because we cannot now try them for want of room, in the parting-room, and there is no other place to try them. I can make the trials in a few days.

If we are to be paid according to the saving, it is our interest to recommend the most economical method, and this was the reason why I wished you to note the minutiæ of my process, so that we could make a comparison between them. The materials in my process cost by one variation 11, and by another 14 cts. per pound of gold; or in round numbers, 1 ct. per oz.; by your process they cost about 2 cts. per oz,, from my experiments. Now as there is credit or scientific reputation arising from these processes, I propose to you in order to obviate your objections to the use of my process, that after they have been sold to the Government, we should unite in a short essay upon refining gold, embracing these processes as belonging to both jointly.

If you wish to communicate with one of my special friends in the House, you may speak to Mr. Hay from New Jersey. I told him our prospects and our union. He will go for anything that will favor me personally. You may speak to him freely, for he is a very prudent man.

Yours truly,

JAS. C. BOOTH.

Prof. R. S. McCulloh,
Washington City, D. C.

No. 24.

Washington, Sept. 23, 1850.

My Dear Sir:

To have stated that the mint is now overtasked with refining; and, *therefore*, that a more efficient method is both desirable and necessary, would certainly have been to do more than merely to utter a "truism." And I can see no reason, upon reflection, why Dr. Patterson should have hesitated so to do, at your request, and for the information of the Secretary of the Treasury and the appropriate committees of Congress.

The determination of the relative cost of the old and new processes is a matter which will have to be performed, after the passage of the act, in pursuance of such directions as the Secretary of the Treasury may then give; and the questions involved are questions of fact, not of hypothesis or opinion. As interested parties, we, of course, would each have and exercise the right to know and be satisfied, that the determination shall be just and true; and until so satisfied we would make no contract. I, therefore, do not see that any impediments can be thrown in our own way by any one, even if so disposed.

I am not aware of the nature of the alterations which you say you are urging forward; but I presume they are not such as would interfere with the means of readily determining hereafter, by actual operations, what *the true cost* is of the process now employed for refining gold in the mint, satisfactorily *to each* of ourselves, to the director, and to the Secretary of the Treasury, in obedience to the aforesaid directions.

I have no professional pride that would be wounded by your preferring to use you own method. And I can readily imagine that the large quantity of zinc used in mine may render it more expensive than yours. Our interest *demands* the selection of the cheapest. In trying mine, you should not use more than fifty pounds; and you should work it upon a test, using *a little* nitre, or not, as you may see fit; one per cent. of lead, mixed with one-tenth of its own weight of copper is the best purifying agent, and more than enough, one-half will probably do; you need not mind sulphate of lead, the test will remove it. The large test furnace in the cellar is the only one which you have for such work.

Such a publication as you propose might disseminate accurate details to be used for the infringement of our rights; therefore, until sufficient time shall have elapsed for us to have perfected every thing, and guarded every weak point, their publication might be indiscreet.

You need not apprehend that I will misunderstand any of the officers of the mint, for each of them is well known, correctly estimated, and justly considered by me.

I will freely confer with your friend, Mr. Hay, if I should have any occasion so to do. The amendment passed the Senate unanimously; and I apprehend no difficulty in the House, though it may arise.

Very respectfully yours,

R. S. McCULLOH.

Prof. J. C. Booth,
U. S. Mint.

No. 25.

WASHINGTON, 7th Oct., 1850.

J. W. McCULLOH,

DEAR SIR:—I write to inquire whether you are authorized to accept in behalf of your son, the terms proposed by Congress for the process for refining gold. I am prepared to do for Mr. J. C. Booth whatever may be prudent in the premises and shall be glad to have your views upon the subject.

Respectfully,

Your obedient,

HENRY M. MORFIT.

No. 26.

U. S. CHEMICAL LABORATORY,
Pikesville, Md., Oct. 23d, 1850.

MY DEAR SIR:

I write to inform you that Mr. J. C. Booth has and will have my assent to any action he may think proper to take with regard to the sale, to the U. S. Government, of his patent for refining gold. Believing in the maxim of a "bird in hand worth two in the bush," and as an interested party, I think it prudent and advisable to accept the $25,000 at once, rather than delay and risk the loss of it upon the mere hope of obtaining a larger sum. Here we have a certain amount guaranteed, let us take it; and if after trial of the new processes, either should prove as desirable and economical as anticipated, we can present a claim for additional compensation. We thus avoid all possibility of having our labour in vain, while we retain a reasonable chance of obtaining a liberal reward from another Congress. I am decidedly in favour of the sale at $25,000, and hope that all concerned are or soon will be of the same opinion.

Yours truly,

CAMPBELL MORFIT.

Prof. R. S. McCULLOH,

No. 27.

DEAR RICHARD:

I saw Mr. Morfit senior, last night, and as I found him not prepared to advise a sale of Booth's interest and his son's, in

your discovery and Booth's, at the rate of $25,000 for both discoveries; I may tarry a day or so ere I come to you: he would not expect any gratuity from Congress, if this sum were accepted for the use of said discoveries in the mint and branches, and deems that hope of his son an idle one: but he bade me recollect that if you and Booth accept the $25,000 from the Government, it would be only for the right to use the discoveries in the Mint; consequently that the sale of rights to individuals would remain to you; and for a while he felt inclined to think the remaining right might be valuable, but finally agreed that it would not be worth much, if anything, provided the Government had the right to use the discoveries in the mint.

By the enclosed monthly statement of the balances of public money for September, you will see that the bullion fund at the mint and branches was quite $5,500,000: the next statement will show some increase, I believe about $200,000 additional: when published I will send you a copy. The interest on that fund is at the rate of $330,000 per annum, occasioned chiefly by the want of a rapid, cheap process of refining at the mint. Somebody is incurring a serious responsibility, in not treating for its use.

I shall see you in a few days hence.

Affectionately yours,

J. W. McCULLOH.

No. 28.

PHILADELPHIA, 1 Nov. 1850.

DEAR SIR:

Mr. Morfit has written to me to know what course should be taken when the Report of the Director of the Mint shall have been made to the Pres. and Sec'ry Treas. Have you ascertained the wishes of the parties interested with you in relation to this subject? when known, please inform me.

The experiments on the processes progress slowly in consequence of the increasing quantities of gold from California demanding all attention in order to keep up with the deposites. I suppose I shall be able to report the completion of the experiments in the course of a week or two.

Respectfully yours,

JAS. C. BOOTH.

Prof. R. S. McCULLOH,

Princeton, New Jersey.

No 29

PRINCETON, Nov. 2nd, 1850.

My dear Sir,—Your letter of yesterday gives me the first and the only intimation I have received, that a "report from the Director of the Mint to the President and Secretary of the Treasury," in relation to our methods of refining, is about to be made.

When the Secretary of the Treasury shall have received that report, I can properly speak and act with reference to it; but, previously, I could not feel at liberty to take notice of any thing the Director may propose to say or do officially.

I have not consulted Mr. Butterworth, nor my counsel, concerning the course of action which may be wisest in view of all circumstances. My engagements are confining and my duties imperative.

From C. Morfit Esq., I have received a letter expressing his willingness to concur in anything you may do, and his desire that the $25,000 be accepted.

Very Respectfully Yours,
R. S. McCULLOH.

PROF. J. C. BOOTH.

No. 30

PRINCETON, Nov. 8 1850.

MY DEAR SIR:

My father writes to me from Washington that H. M. Morfit, Esq., as your agent, expresses unwillingness to sell our patented processes to the govt. for $25,000 appropriated by Congress.

How is this? Have I misunderstood your wishes and views, in this matter, or does he do so.

Yours truly
R. S. McCULLOH.

Prof. BOOTH.

No. 31

PHILA'D. 11, Nov. 1850.

DEAR SIR:

As Mr. Morfit has nothing to do with the acceptance or non-

acceptance of the $25,000, he has no opinion or wish in relation to it. Your father must I think have misunderstood him, for I have his letter advising the acceptance. You have C. Morfit's letter on this subject, and my assurance with my reasons for acceptance. Surely these are all sufficient on our part. Mr. M. is only our agent in this matter. I await your own decision.

Yours truly

JAS. C. BOOTH.

Prof. R. S. McCulloh,
Princeton College
New Jersey.

No. 32

Princeton, Nov. 18, 1850.

My dear Sir:

Mr. H. M. Morfit's views cannot have been misunderstood. He was "not prepared to advise a sale of *both* discoveries for $25,000."

In his letter to me, Mr. C. Morfit simply says: Mr. Jas. C. Booth "will have my assent to any action he may think proper to take with regard to the sale to the U. S. Government of his patent for refining gold."

Do you propose to sell both methods to the U. S. for $25,000? and if so will the Messrs. Morfit concur with you?

What experiments have you been, and are you now, trying? what are the results? also, what have you done, or do you intend to do with the $100,000 which you commenced to refine by my method in July, and had still lying in your vault unfinished when I saw you in October?

Very truly yours

R. S. McCULLOH,

Prof. J. Booth.

No. 33

Phild'a. 21, Nov. 1850.

Dear Sir:

I can only repeat what I said in my previous letter that Mr.

H. M. Morfit can only advise as my agent, that the decision rests with me, and that I gave you I thought the best reasons for aeeepting the gov't. proposition; sinee our propositions were first made, two foreign proeesses have already been published, and the influx of California gold will awaken attention to refining and originate new proeesses. Mr. C. Morfit undoubtedly ineluded any right he had in the whole when he wrote to you, and if you write him, I am sure he will tell you to the same effeet.

I have been trying many expts. and have eonquered many unanticipated diffieulties. I have found a process for finishing yours whieh I think an improvement and am at this moment trying it. My own proeess is so far sueeessful, but is not quite eomplete, I think I ean say certainly now eaeh will work in the course of a week.

Yours truly

JAS. C. BOOTH,

I await your decisions still in relation to the sale, J. C. B.

No 34

PRINCETON, Nov. 21st, 1850.

MY DEAR SIR:

Pleasc state briefly the ehemical nature of the two foreign processes, and give me the names and dates of the publieations in whieh they are deseribed or mentioned.

If I am not mistaken in my reeolleetion of it, the clause of the appropriation act, eonstituting "the proposition of the Government" whieh you gave me reasons for exeepting, merely authorizes the purehase for $25,000 of the right to use *either your* method *or mine*. Therefore, I wish to know whether you desire to sell *both* methods. And you will permit me to say, in all frankness and courtesy, that if we are to aet together our understanding should be explicit.

You will oblige me by answering my inquiry about the $100,000, which you undertook to refine by my method. I wish to know what has beeome of it.

Of my decision, which you say you await, I do not feel called upon to make it, before it shall have eeased to be a matter of perfect indifference to the Director of the Mint and the Secre-

tary of the Treasury whether an improved and more economical method of refining can be purchased, nor until the Secretary shall be prepared to act upon the matter.

Very Respectfully Yours,
R. S. McCULLOH.

Prof. J. C. Booth.

No. 35.

Philadelphia, 25 Nov. 1850.

Dear Sir:

One of the processes alluded to consisted in the use of chloride of lime; another of the same and of hyposulphite of soda; a third, of a dry method, in the use of salt, salammoniac, brick dust, (!) &c. The last process is in Newton's Journal for Sept. or Oct. 1850, as well as I recollect; the others I believe are in the Chem. Gaz., but one of them I read in the Chem. Centralblatt for 1850. Had I thought them good processes I should have studied them more closely, and have mentioned them to you before in detail, but I merely noted them to show that attention was awakened to improved methods of extracting and refining gold.

I expressed my reasons for accepting the offer of $25,000 for *the use* of both methods, as I understood from you personally in Washington, and it was so expressed to the Committee of Senate, that both were offered to the Government. I therefore think we are morally bound to offer both, as the offer may have influenced their decisions. Now having expressed my views as clearly and frankly as I am able, I think in all courtesy I may expect the like explicit statement on your part.

I have more than once, I believe, stated to you that I had been experimenting on both methods or processes, and upon that $100,000 among the rest, and in my last letter, (please refer to it) said that I would be able to report to you in the course of this week. I objected to the method of toughening proposed, and have been trying others. I can now state that I have obtained toughened gold by both processes, and can work either of them on a large scale.

I have two duties to perform: the one private, to yourself and myself; the other public, to the Mint, Government, and Public. I cannot permit private interests to interfere with pub-

lic, and therefore I have been obliged to experiment at intervals, while I have been raising the refining capacity of the mint to four millions per month. I am now about to raise it to five or more millions in the same time, and can if necessary raise it much higher by the old process. This I am bound to do without reference to my private interest, if I am called upon to do so. Now I would prefer a new process on several accounts, and I think it very desirable that we should form a decision as to our willingness to accept or not, at an early day, before such changes are made, for after they shall have been made there will be less reason for adopting a new process.

I believe I have answered all you desired to know in a free and explicit manner, and if I have not done so at any time, it certainly was not designed on my part. And if, as you remark, "we are to act together, our understanding should be explicit," then I think I may fairly ask for a corresponding expression on your part of your ultimate designs and wishes.

Very respectfully yours,

JAS. C. BOOTH.

Prof. R. S. McCulloh,
Princeton College, New Jersey.

No. 36.

Princeton, Nov. 26th, 1850.

My dear Sir:

The foreign processes are destitute of efficacy and value, if not also of novelty. And I am pleased to hear that you can work both of our methods upon a large scale.

Your letter of the 25th inst. expresses your wishes and views as fully as I can desire; and when I shall have decided what to do you shall know my wishes and decision. Nor will there be the slightest want of explicitness or propriety in my relations either to yourself or the Government.

When the interests of others, as well as my own, are involved in my decisions, I am not apt to make them hastily. And I beg leave to refer you to the declaration I have already made, that I do not feel called upon to form any determination before I shall know whether or not the Government has ceased to be utterly indifferent upon the subject of obtaining a more prompt and economical method of refining.

You are, I think, mistaken in believing we are "bound *morally* to offer both methods" to the Government for the $25,000. For, though it is true *we did offer* both *for the one half saving* in labour and materials, it is equally so that *our offer was refused.* The clause of the civil bill appropriating $25,000 was then drawn up and carried, *by our opponents*, acting independently or as they alone saw fit. Of its meaning, or the interpretation put upon it by its authors or by others, we have no means of knowing except by the language they employed. And we can be under no obligation in law, and certainly none in morals, to construe that clause otherwise than by its letter.

In the above I wish to be distinctly understood as neither expressing, nor implying, any wish, purpose or opinion concerning the expedieney of our selling both methods, or only one, for $25,000; but only as arguing that though it may be our pleasure and interest so to do, it is not our obligation. The question of *both* or *only one* is not one of my starting, but originated, I presume, with your friend and counsel H. M. Morfit, Esq.; and, therefore, have I written to you at all about it, for information concerning your wishes.

If my inquiries in relation to the $100,000, your experiments, &c., have been ascribed to impatience, or if they have led you to suppose me desirous of interfering with or disregarding your public duties, they have been misunderstood.

That the arrangements for refining by the old method have been, and still are to be, enlarged, causes me no regret or apprehension. But in relation to the continued use of that old method long after the public interests and those of the owners of bullion have demanded a more rapid and economical process, and after one has been discovered and offered to the Government upon any just and equitable terms, questions must arise which the Mint may find it difficult to dispose of. If such a method has been necessary, how can the omission to advise the Government of that necessity or "truism" be justified? How can the loss of thousands of dollars, in interest to the U. S., be justified or repaired? And if a new and rapid proeess would reduce the charge for labour and materials required to refine California gold, ought not the Mint to advise the use of that process to save that part of the expense which is now needlessly kept upon the owners of such bullion?

Very truly yours,

R. S. McCULLOH.

Prof. J. C. Booth.

No. 37.

U. S. Chemical Laboratory,
Pikesville, Balt. Co. Md., Nov. 28, 1850.

Prof. R. S. McCulloh,
Princeton, N. J.,

Dear Sir:

I wrote to you some weeks since in regard to our patent for refining gold, and recommended its sale to the U. S. Government, for the $25,000 which has been appropriated for the purchase of it. Not having received a reply I write again to repeat, that as the value of an invention is very precarious when so many improvements are being constantly made, I think it better to accept the terms provided in the act of Congress and will be glad if you will say whether you will coneur or not.

Whatever is to be done in the matter should now be done without delay and, therefore, I beg you to write your answer at once, that we may act as soon as a report from the Director of the mint is made.

I shall write to Booth to day saying that I have written you as above, and at the same time will urge him to hasten the completion of his experiments.

Yours truly
CAMPBELL MORFIT.

No. 38

College of New Jersey,
Princeton Nov. 29th, 1850.

My Dear Sir:

In reply to your favor of the 28th inst., I would state, that your former letter would not have been so long unanswered, if I had not deferred writing with the expectation of being soon able to give you a definite response in relation to the path which I may determine to pursue.

I have been, *and still am*, so entirely in ignorance of the views and purposes of the Government, with reference to the purchase of both, or either, of our methods of refining gold, whether for $25,000, or for *any* valuable consideration whatever, that I have felt it to be the wiser path to repose, until I shall at least know, whether they have a wish, or *willingness*, to obtain them.

You *allude* to a "report from the Director of the Mint," so also has Prof. Booth done in one of his letters to me. But that "report" has not only not been made, but it *may probably never be* made; and so far from feeling any confidence that, if made, it will be favorable to our interests, I believe that it would be adverse. And this notwithstanding that Booth has written to me that he "can readily work both processes upon a large scale," as the result of his experiments. For Peale's wishes would outweigh other matters in Mint affairs; and *he has no interest in* our success, no love for me.

Under such circumstances, I prefer to shape my purposes and action by events which may transpire, and which, *for a short time*, I can await patiently. And I have written to Prof. Booth that "I do not feel called upon to form any determination before I shall know whether the Director of the Mint and the Secretary of the Treasury have ceased to be utterly indifferent upon the subject of obtaining a more prompt and efficient method of refining."

In conclusion, I should say that I feel assured that the Secretary of the Treasury will act only as the public service may, in his judgment, require; and I entertain a high opinion of him.

With the kindest regard

Very truly yours,

R. S. McCULLOH,

CAMPBELL MORFIT, ESQ.,

Pikesville, Md.

P. S. Accept my thanks for a copy of your address delivered in Baltimore.

No 39

PRINCETON, Dec. 3, 1850.

MY DEAR SIR:

I have received a letter from C. Morfit Esq., inquiring what I design to do in relation to the offer of $25,000; and urging its acceptance when "a report from the Director of the mint" shall have been made.

In reply, I informed him that I am confident, notwithstanding your successful trial of each process, that either no such report will be made, or that it will be against the purchase of our methods; and, therefore, that I believe any determination concerning the $25,000 offer would now be unwise and premature.

If "*the Mint*" is inclined to let the adoption of our processes go by default, I am not willing that they should be disposed of so easily.

And if "*it*" intends to persist in its course of opposition to economy and improvement, and in its thinveiled personal hostility to myself and my interests, I am ready, though most unwilling, to assume adverse relations and to abide the issue of honorable battle. From motives of kind feeling and generosity, I would have have it otherwise, if it may be so.

In the event of such a crisis your mixed relations to the mint, to our patents, and to myself, will be inconsistent with any other than a course of perfect neutrality and inaction on your part; and I shall, therefore, feel entirely free to act as I may find necessary.

Although this letter is designed simply for your information concerning my "ultimate purposes," I yet desire and request a speedy and frank expression of your views in relation to its contents.

Very truly yours,

R. S. McCULLOH,

Prof. J. C. Booth.

No. 40

Philad'a, 5th Dec. 1850.

Dear Sir:

Yours of the 3d inst. was duly received. I agree with you that if there was any disposition to make an unfavorable report on the part of the Mint, when my experiments proved favorable, then we ought to take an independent course of action. But I do not apprehend any such event, for the Director has been constantly watching during my experiments, whenever I informed him of them. I am sorry to say that it was but in a single experiment that I obtained toughened gold by the zinc process, and that all others with the same lot gave a brittle metal. This was the last of the $100,000. I have since then melted up 1000 oz. gold, with 2000 oz. zinc, and am now running that through. I have ordered some lead-pots to be lined with a fine fire clay by A. Miller, in order to try and toughen the gold directly in the pot. My process works well in all points, except in the time for making solution, which has never

been enough, in consequence of the other work; but I am now about to try a small house entirely with it, in order to give it time, and also to shorten the whole process. I am sorry to trouble you with these details, but I thought your letter called for them. I am experimenting every day, and have been doing so, except when repairs were going forward, and it cannot now be long before we arrive at a conclusion.

I think you will now see clearly that any action now would be premature, until the process or processes have been shown to be successful.

Yours very truly

JAS. C. BOOTH.

Prof. R. S. McCulloh,
Princeton, New Jersey.

No. 41

U. S. Branch Mint,
New-Orleans, Decem. 10 1850.

My Dear Sir:

I have just completed an experiment on refining by your zinc-method. The gold operated upon was from California, it weighed 29 ounces, and contain 897 ms. of gold and about 113 ms. of silver. It was alloyed with $3\frac{1}{2}$ times its weight of zinc and granulated, when the granulated mass was found to weigh 99 oz., only. After treating the granulated metal with dilute sulphuric acid, without the aid of any heat, but that evolved by the solution of the metal, the resulting powder, which was very fine, was washed, and treated in a glass matrass, first, with dilute nitric acid, and after the action had nearly ceased, with hot strong acid (of about 36° Beaumé.) The solution of silver being decanted, the powder was washed on a filter, dried and melted in a Hessian crucible, with nitre and borax.

The bar of gold obtained, was *perfectly* tough, without any addition of copper. The assayer's report shows it to contain 982 ms. of gold and 18 ms. of silver. It is all that can be desired, for by the old process (by quartation with silver,) it is rare to have the gold contain less silver, and it certainly is as tough as any gold I have ever seen.

Moreover, I confidently expect that it can be refined still further, by paying attention to the granulating, which in this

case, was not as perfect as I might have wished. I consider it an easy matter, to recover all the sulphate of zinc, which I think, would amply pay for the zinc and acid consumed.

But the greatest advantage is in dispensing with the quartation silver, and avoiding the great labour of dissolving, precipitating, reducing and melting such an enormous amount of metal, besides saving the wastage, and doing away with the large apparatus now necessary for working the silver.

I have now in hand 40 ounces of California gold of 897 ms. which has been well granulated; in a few days I will let you know the result.

Yours Very Truly,
M. F. BONZANO.

To Professor R. S. McCulloh.

No. 42.

Washington, Dec. 23d, 1850.

Sir:

A rapid, cheap and valuable method of refining gold, by the use of zinc, &c., having been discovered and perfected by me, and the requisite steps to secure to myself the right thereto by letters patent of the United States, having been duly taken, I addressed a letter, on the 11th of February 1850, to the Director of the Mint, (copy whereof marked A is enclosed,) in which I informed him that I had discovered a much more economical, convenient and efficient process for refining gold than that employed in the mint, or any other known method, and offered to sell to the United States the right to use the same in the mint. To that letter, contrary to my expectation, I received no reply.

On the 1st July 1850, I addressed a letter to the Hon. W. M. Meredith, then Secretary of the Treasury, informing him of the aforesaid discovery and of its importance as a means of relieving the Treasury from making unnecessarily large and protracted advances for the accommodation of the depositors of bullion, and reducing the mint charges for refining to said depositors. Also that an outlay of $1000 would probably cover the cost of the alterations and apparatus requisite to enable the mint at Philadelphia to refine ten millions of dollars per month. In this letter (of which a copy, marked B, is herewith furnished,) any further information was proffered and the right to use said method was offered to the Government for an equitable consideration.

On the 5th of July, I memorialized Congress in relation to my

discovery and announced my willingness to grant the right to use it in the mint and its branches either for a just sum in gross or a fair share of the saving to be effected by the use thereof. And having stated in said memorial, copy of which is enclosed, that I had addressed a communication to the Secretary of the Treasury upon the subject, I caused it to be published in the Union of July 10th, 1850.

In a letter addressed to me, at Washington, and dated July 9th, 1850, (of which I enclose a copy marked C,) the Melter and Refiner of the mint at Philadelphia, Prof. James C. Booth, informed me that he had every reason to believe he had been pursuing the method of refining invented by me, and that he had written a letter to me at Princeton upon the subject, proposing to unite his method to mine, not knowing them to be the same (of which letter, dated June 29th, a copy, marked D is enclosed); also that he had said to the Director of the mint, when a letter from the Secretary of the Treasury concerning my above mentioned communication of July 1st was shown to him, that he had been working with my method and "would value it very high, say $50,000 for the United States or possibly double that amount." He advised me to guard my patent on one point to prevent infringement, and offered to assist me by giving an opinion of my method, saying: "I can give a full opinion on it, for I have worked it all out in detail on large quantities of metal."

After having written as above, Prof. Booth, in a letter to me dated Aug. 13th, informed me that he had attempted to refine $100,000 of gold with zinc; part of which gold had "proved so brittle after melting" that he was "at a loss what to do with it." That he had "no time to experiment with the gold" and was "so disappointed with the result" that in company with C. Morfit, Esq., he had been "working out another process of refining on different principles" which he "believed would be very successful."

In a letter to me, dated Aug. 16th, Prof. J. C. Booth said of his own method, "there were serious objections in the way of its use. These I have now entirely obviated and rendered the process short, easy of execution, safe from loss of gold or silver, and the cheapest yet devised." And he adds "our processes are so nearly on a par that it would be for our mutual benefit not to compete." Believing that it would be wise to unite the two methods and dispose of them both to the Government, upon the same terms originally offered by me for mine alone, I proposed to Prof. Booth and announced my willingness to form such a union as soon as he should make known to me confidentially the details of his process.

While Prof. Booth's application for letters patent was pending, he declined to make any such confidential disclosure to me as I deemed prerequisite to our union; and through his counsel he

memorialized Congress and invoked the attention of the Treasury Department to the subject of his invention. The Director of the mint also addressed to the Commissioner of Patents a letter, dated 5th of Sept. 1850, urging prompt attention to said application, as a measure of great importance to the interests of the mint, and particularly desirable to permit a rapid and economical method of refining to be substituted for the slow and expensive one in use, and render unnecessary the enlargement of the apparatus then in progress. A copy of which letter, marked E, is herewith submitted.

When Prof. Booth had obtained a patent for his process of refining, and assured me that he had tried and perfected all the details, and proved its entire success by actual experiment upon a sufficient scale, perceiving no conflicting theoretical reason and confiding in his integrity and known chemical skill, I made with him an agreement by which we united our interests. We then concurred in offering both processes to the United States through the Congress; who saw fit to appropriate $25,000 to enable the President to purchase the right to use said new methods, or any other method, if he should deem it expedient to do so.

To induce Prof. Booth to make trial in the mint of my method, as set forth in the specification of my patent, I gave him, in a letter dated Sept. 23d, 1850, my views in detail as to the manner in which I believed the gold would be most readily obtained fine and tough with the apparatus used in the mint and designed for other purposes. And I have since from time to time, written to and received letters from him.

In a letter to him of Nov. 18th, I asked: "what experiments have you been and are you now trying? What are the results? Also, what have you done, or do you intend to do with the $100,000, which you commenced to refine by my method in July, and had still lying in your vault unfinished when I saw you in October?" In his reply of Nov. 21st he merely said, "I have been trying many experiments, and have conquered many unanticipated difficulties. I have found a process for finishing yours, which I think an improvement and am at this moment trying it. My own process is so far successful, but is not quite complete. I think I can say certainly now each will work in the course of a week."

Not satisfied with this imperfect information I wrote again to Prof. Booth, as follows: "You will oblige me by answering my inquiry about the $100,000 which you undertoook to refine by my method. I wish to know what has become of it." In a letter of Nov. 25th, he replied: "I have more than once, I believe, stated to you that I had been experimenting on both methods or processes, and upon that $100,000 among the rest, and in my last letter, (please refer to it) said that I would be able to report to you

in the course of this week. I objected to the method of toughening proposed, and have been trying others. I can now state that I have obtained toughened gold by both processes, and can work either of them on a large scale. I have two duties to perform, the one private to yourself and myself, the other public, to the Mint, Government and Public; I cannot permit private interests to interfere with public, and therefore, I have been obliged to experiment at intervals, while I have been raising the refining capacity of the mint to four millions per month. I am now about to raise it to five or more millions in the same time, and can if necessary, raise it much higher by the old process. This I am bound to do without reference to my private interest, if I am called upon to do so." He adds: "when such changes shall have been made there will be less reason for adopting a new process."

I therefore felt called upon to write to Prof. Booth on the 26th November, and among other things to say: "if my inquiries in relation to the $100,000, your experiments, &c., have been ascribed to impatience, or if they have led you to suppose me desirous of interfering with or disregarding your public duties, they have been misunderstood. That the arrangements for refining by the old method have been, and still are to be, enlarged, causes me no regret or apprehension. But in relation to the continued use of that old method long after the public interests, and those of the owners of bullion, have demanded a more rapid and economical process, and after one has been discovered and offered to the government upon any just and equitable terms, questions must arise which the Mint may find it difficult to dispose of. If such a method has been necessary how can the omission to advise the Government of that necessity, or "truism," be justified? How can the loss of thousands of dollars in interest to the U. S. be justified or repaired? And if a new and rapid process would reduce the charge for labor and materials required to refine California gold, ought not the Mint to advise the use of that process, to save that part of the expense which is now needlessly kept upon the owners of such bullion."

In the last letter which I have received from Prof. Booth, dated December 5th 1850, (copy of which, marked F, is herewith presented,) he seems to regard both his own method and mine as problematical, and speaks of action as "premature, until the process or processes, have been shown to be successful."

The doubt which Prof. Booth had cast upon the practicability of my method, led me to address a letter on the 23d of November, to Dr. M. F. Bonzano, Melter and Refiner of the Branch Mint at New Orleans, requesting him to make trial thereof, and giving him the requisite information and instructions. In his reply, dated, December 10th, 1850, (copy of which is enclosed, and

marked G,) he says: "I have just completed an experiment on refining by your zinc method. The bar of gold obtained was *perfectly* tough, without any addition of copper. The Assayer's report shows it to contain 982 ms. of gold, and 18 ms. of silver. It is all that can be desired, for by the old process, (by quartation with silver) it is rare to have the gold contain less silver, and it certainly is as tough as any gold I have ever seen. Moreover, I confidently expect that it can be refined still further, by paying attention to the granulating, which in this case was not as perfect as I might have wished."

In view of the various and unsatisfactory statements which I have received from Prof. Booth, Melter and Refiner of the Mint at Philadelphia, in relation to his experiments; which, if designed to test the methods patented by himself and me, should, I suppose, have at least included the trial of the preferred means for obtaining correct results designated by each inventor for his own process; which course has been "*objected to*" by Prof. Booth with reference to my method; so that I have yet to learn certainly whether he either has or will subject it to the most appropriate trial, as well as whether his own method is or is not valuable and efficient: in view of the aforesaid successful trial of my method by the Melter and Refiner of the Mint at New Orleans: and in view of the importance to the Mint and to the depositors of bullion of obtaining a more prompt and economical method of refining gold, which you have mentioned in your recent annual report to Congress, and which the Director of the Mint has set forth in his aforesaid letter to the Commissioner of Patents: I am induced to request that you will take such action as in your judgment is requisite to cause the respective merits of the said methods of refining to be correctly and immediately determined. And I would respectfully suggest that the desired end may be attained by instructing the Director of the Mint to have my process tried without delay, under my direction and in the presence of Prof. J. C. Booth, by such workmen as shall be detailed at my request, and the process of Prof. Booth similarly tried under his direction and in my presence: said trials to be in each case under the superintendence of such officers of the Mint, or appropriate persons, as you may designate; who shall report the result to the Director of the Mint to be transmitted to you, with such views of his own as he may deem fit and useful.

Very Respectfully,
Your Ob'nt Servant,
RICHARD S. McCULLOH.

Hon. Thos. Corwin,
Secretary of the Treasury.

No. 43.

U. S. Branch Mint,
New Orleans, Dec. 23d, 1850.

My Dear Sir:

I have just completed four experiments on refining by your method, and it affords me great pleasure to say that the gold, in every instance, was readily toughened, by simply melting it with nitre. The assay-report on the four lots is as follows: No. 1, 982 ms. gold, 18 ms. silver; No. 2, 990 ms. gold, 10 silver; No. 3, 991 ms. gold, 9 ms. silver; No. 4, 990 ms. gold, 10 silver. Nos. 1 and 3 were alloyed with $2\frac{1}{2}$; Nos. 2 and 4, with $3\frac{1}{2}$ parts of zinc.

The quantity of gold operated on was about 30 ounces in each experiment, and contained on an average about 11 per cent of silver.

No difficulty of any kind presented itself during the different stages of the process, and the time required for "working" was about as long as it usually is, in working by the silver-quartation method.

Yours very truly,
M. F. BONZANO.

To Prof. R. S. McCulloh,
Washington.

No. 44.

Washington, Jan. 1, 1851.

Sir:—Herewith I have the honor to submit for your consideration, a copy of a letter, dated Dec. 23d, 1850, which I have received from the melter and refiner of the U. S. Branch Mint at New Orleans, Dr. M. F. Bonzano, informing me of four successful trials of my method of refining gold.

The quantity of gold operated upon was, in each instance, small, 30 ounces only; but this was owing, I presume, to the fact that the mint at New Orleans, is not provided with a large cupelling furnace and other apparatus suitable for a trial upon a large scale. Such has not been the case at the mint in Philadelphia, where the melter and refiner, Prof. J. C. Booth, has possessed every facility for trying my method upon large quantities of gold in the manner specified by me, and might have so done.

Dr. Bonzano speaks of the time required for "working" as about as long as it usually is in working by the silver-quartation method; thus confirming my statement heretofore made, that the new method is attended with great economy of time and labor, inasmuch as the refining of the gold is done in the usual time, and the subsequent operations for recovering the silver in the old method are dispensed with in the new; which silver work requires as much time and labor as the gold refining itself, and demands a large and unnecessary investment of capital, $200,000, or 5¼ tons in weight, of silver, to be from week to week melted with and recovered from the gold bullion, subject to continual waste, and needlessly withdrawn from circulation.

Very respectfully
Your obedient servant,
R. S. McCULLOH.

Hon. Thos. Corwin,
Secretary of the Treasury.

No. 45.

Washington, Jan. 3d, 1851.

My Dear Sir:

As it is more than a month since you assured me that you would be able, in the course of a week, to report to me the results of your experiments on refining gold; and as I have not received such a report, I have to request that you will now furnish it.

Very respectfully
Your obedient servant,
R. S. McCULLOH.

Prof. J. C. Booth.

No. 46.

Philadelphia, 4 Jan. 1851.

Dear Sir:

I should have been able to make a report upon the processes before this time, had not the imperative character of the law required me to render up all the gold in my hands to the Treasur-

er in order to ascertain the run of my Dept., while at the same time the deposite of 5 millions in Dec. pressed upon me to go forward. I could make a report now, but as it would not be satisfactory, I am sure you do not wish it any more than I do. I am erecting a test furnace with a hearth $3\frac{1}{2}$ feet square by which I can test your process fully, and my reason for not erecting it before was that it would have seriously interfered with the work of the mint. The furnace is nearly built and I believe from appearances that I can try it by the close of next week, but not before.

Very respectfully yours,

JAS. C. BOOTH.

Prof R. S. McCulloh,
Washington City, D. C.

No. 47.

Washington, Jan. 10th, 1851.

Dear Sir:

I regret to have received from you the reply contained in your letter of the 4th inst. More than three months have now elapsed since, in reliance upon your assurances that you had discovered a better and cheaper method of refining gold even than my own, I entered into an agreement with you to unite the two. And it would now seem that, instead of establishing the efficacy of your method sufficently to satisfy even the Director of the Mint that he should advise the Government to acquire the right to use the same upon equitable terms, in pursuance of his views of the great public importance of such an improvement, as set forth in his letter of September 5th, 1850, to the Commissioner of Patents, you have been enlarging the arrangements for refining by the old, costly and slow process, to a two or three fold extent, and of course at considerable expense.

If your process is what you have stated it to be, I cannot comprehend the course you have pursued, for increasingly heavy deposites have only constituted an urgent reason, why a cheap and more efficient method should have supplanted the one in use, rather than that the latter should be perpetuated and expanded.

If, on the contrary, your process is attended with difficulties,

you owe it to yourself as well as to me, by reason of the aforesaid assurances, to communicate them to me promptly, fully and unreservedly; and I now request you to do so.

Of my own process, I will only say that I have foreborne to press it, for I expected you to adopt your own, pronounced by you to be superior; although I have known mine to be one which at any time may be shown in 48 hours to be all that is needed, as it has been successfully tried by myself, affirmed to be efficient and valuable by you, and since established by confirmatory trials made by others.

There is a grave and serious responsibility somewhere, in relation to this matter, which my interest may require me to probe to the bottom.

Very Respectfully yours,
RICHARD S. McCULLOH.

PROF. J. C. BOOTH.

No. 48.

PHILADELPHIA, 14th Jan. 1851.

DEAR SIR:

By way of reply to your letter of 10th inst., received yesterday, and because of my being much occupied, I must refer you to former letters for my reasons for continuing the old process, where I refer to a two-fold duty, the one to the government and the other to myself, the former of which is paramount; where I state that neither process had yet been sufficiently freed from difficulties to give a favorable report thereon; that I have repeatedly experimented on both processes; and that I would again experiment on them as soon as my accounts for the year were closed. You have been made fully aware of the difficulties of experimenting in a confined space, where frequent alterations have been necessary; and you are unquestionably mistaken in supposing you could satisfy any one in 48 hours of the superiority of your process. For to carry it out on a *working* scale, even where all the apparatus is ready to your hand, it will require a week's time, and you must be aware that such apparatus is not yet ready. There has been no place in the mint where a test of sufficient size could be erected, until within a few weeks, and the moment the place was afforded, the erection of a furnace was commenced. It is now nearly completed.

It is wholly unnecessary to enter into detail in relation to the

difficulties I have met with in carrying out your process or mine on a working scale, for want of time compels me to be brief. Unless I am deceived in each of them I can report on them both next week and favorably.

Although I do not by any means agree with you as to the very inferior character of the present process, yet there are quite sufficient reasons why another, if better, should be adopted; and my enlargement of the working capacity of the mint in refining will by no means interfere with the desirableness or convenience of introducing another; for all the changes I have made, are of such a nature as to be applicable to any of the three processes in view.

Very respectfully yours,

JAMES C. BOOTH.

PROF. R. S. MCCULLOH.
Washington, D. C.

No. 49.

WASHINGTON, Jan., 16th, 1851.

DEAR SIR:

Will you do me the favor to direct that copies of any letters from the Treasury Department to the Director of the Mint, asking his views of, or authorizing him to try, my new method of refining gold, and of the replies thereto, may be furnished to me for my information and use.

With great respect,
Your obedient Servant,
R. S. MCCULLOH.

HON. THOMAS CORWIN,
Secretary of the Treasury.

No. 50.

TREASURY DEPARTMENT,
Sept. 10, 1850,

Sir,—I herewith transmit a copy of a proposition made to this Department by Henry M. Morfit, Esq. of this city, in relation to a new mode of refining gold.

In order to test the practicability, economy and usefulness of the proposed plan, you are requested to compare it in all "*results*" with any other used or known at the Mint, and to report to this Department all the particulars of such comparison, as well as the value of the process in refining gold.

Very respectfully,
Your obedient servant,

THOS. CORWIN,
Secretary of the Treasury.

ROBERT M. PATTERSON, Esq.
Director of the Mint, Philadelphia.

No. 51.

TREASURY DEPARTMENT,
Jan. 11, 1851.

SIR:—The Department is desirous of testing with as little delay as possible the method of refining gold patented by Prof. R. S. McCulloh, as well as that by Mr. Booth, and wishes that this should be done by skilful workmen in presence of both of the above gentlemen. The delay which has already attended the testing of Mr. McCulloh's method has been the cause of many complaints being presented to the Department, which it is desirous should now be completed as early as practicable.

You will please report to the Department when you can enter upon this business, and the probable time it will require, with any observations you may wish to offer on the subject.

Very respectfully,
Your obedient servant,
THOMAS CORWIN,
Secretary of the Treasury.

R. M. PATTERSON Esq.,
Director of the Mint, Philadelphia.

No. 52.

MINT OF THE UNITED STATES,
Jan. 14th, 1851.

SIR:—I have the honor to acknowledge your communication of the 11th inst., in which you express the desire of the Depart-

ment that the methods of refining gold patented by Prof. McCulloh and Mr. Booth should be tested at the mint with as little delay as possible, and state that the delay in testing Mr. McCulloh's process has been the cause of many complaints being presented to the Department.

On the 16th ult. I stated to you that the experiments referred to *had* been prosecuted at the mint, but that the results had not proved satisfactory. I now enclose a letter from our Melter and Refiner, in which he states fully the steps which have been taken by him in the matter, and the reasons why no report from the mint can yet be made. From this letter it appears that all the experiments consistent with our regular operations have been tried; that they have not thus far proved successful; and that a final and decisive experiment may be expected within a week or ten days from this date.

It is proper that I should mention that although the processes proposed by Mr. Booth and Mr. McCulloh are distinct in their nature, and were separately patented, yet they agreed to unite their interests. It is therefore apparent that Mr. Booth has every inducement to prove the feasibility of either, or both of them, and their superiority over the present methods. In committing to him the experiments requisite for this end, I, therefore, had the fullest assurances, not only from his official energy and integrity, but from the promptings of his private interests, that the work would be properly done.

If no success has yet resulted, the cause is to be attributed, not to the lack of experiments, but to the imperfection of the processes themselves when tried on a large scale. They have both no doubt been successful in the laboratory; but that, by no means proves that they will be equally so, in the great scale required by our operations. The plan of Mr. McCulloh has not yet furnished ingots fit for the operations of coinage. Whether an improvement which has been suggested will amend this defect, will be proved in the experiments yet to be made.

It seems hardly necessary that I should assure the Department of my anxiety to introduce into the mint every possible improvement by which our operations may be facilitated; but I think I should have been held entirely without excuse had I suspended the active prosecution of the processes already at our command, for the purpose of experimenting on others which were doubtful and untried. So far as any experiments were consistent with the necessary operations of the mint, they have been prosecuted; it was not expected, I suppose, that they should go further.

It is proper to add, in conclusion, that prior to your letter to which this is a reply, the Department has never referred Mr. McCulloh's process to me for examination. The experiments which have been tried, although as thorough as if a reference had been expressly made, have been prosecuted on my own responsibility.

Very respectfully,
Your faithful Servant,
R. M. PATTERSON,
Director.

Hon. Thomas Corwin,
Secretary of the Treasury.

No. 53.

Melting and Refining Department,
United States Mint.
Philadelphia, 13 Jan. 1851.

Dear Sir:

In reply to the queries you addressed to me, in relation to various operations in my Department, permit me, in the first place, to refer you to my letter of 20th Dec. '50, which sets forth concisely and clearly the cause of delays in refining operations of my Department, and shows that a great degree of energy has attended our operations, unprecedented in the annals of gold-refining.

In the 2nd place, in reply to the query touching the experiments on the new processes proposed, I offer the following historical view of my operations and experiments:

1st, From the moment of entering upon the duties of my office, I was impressed with the view that a new process of refining was desirable and, after much reflection, tried many experiments with variable success. About the close of spring, I found one, which I believed to be successful, and on writing to Mr. McCulloh, who I was informed had also a new process, learned that I had re-discovered his process.

Upon further experiments with it on a large scale, I met with less success, as it left the gold in such a brittle state as to be valueless to the coiner. Nor did the expedient proposed by Mr. McCulloh, by using muriatic acid, prove successful in removing

the brittleness. I then reverted to experiments I had made in Dec. '49, and succeeded in evolving a new process for which a patent was issued in Sept. 1850. I then united with Mr. McCulloh to offer both or either process to the Government. Instructions having been received from you to test my process, as I believe you were instructed by the Secretary of the Treasury to do, I immediately devoted myself to testing them both experimentally, on a scale of sufficient magnitude to warrant a decisive opinion on their merits as compared with the present process. I have not omitted any opportunity of experimenting on them both, agreeably to your instructions from that time (early in October) to the present time.

2nd. To give you some account of the difficulties attendant upon these experiments, I must recall to your mind the circumstances of the last three months. The quantity of gold deposited has increased rapidly, and required untiring exertions to bring up the working capacity of the mint to meet the demand. Now, had I taken off my men from the usual routine of work, to experiment, the indebtedness of the Mint would have increased by many millions over what it is at this moment, which would have brought deserved censure on the officers of the Mint, and on the Government by implication. I felt deeply that my duty to the Government was paramount to every other, even to my own interest in the new processes; and, therefore, I have given my men double duty to perform, to experiment on the new processes, and not to diminish the yield of my Department in refined gold.

3d. It is a mistake to suppose that Mr. McCulloh's process has not been tried. It has been tried, again and again, and the methods of toughening the gold varied, without success. One of the difficulties of experimenting, has been the necessity of altering the apparatus to meet the increased deposits, and the danger of having a large number of carpenters and masons present, who are not operatives in the mint, and who required room for the necessary alterations. These alterations have occurred several times during the last three months, and occupied altogether, not less than six weeks.

4th. You ask whether the processes could not be tested in a short time? I answer that neither process can be tested under one or two weeks, on a scale of sufficient magnitude to warrant a positive opinion, unless the operations of the mint were stopped. A large number of experiments on each process has now been tried, and with promise of success; so that, when the present arrangements shall have been completed, it is probable a definite

opinion on them could be given in less than a week. There is no doubt that, had not the imperative character of the law required me to close my gold accounts for the last year, the experiments would have been concluded before this time, as this required me to deliver up all the gold in my possession into the hands of the Treasurer of the mint, to make a settlement and determine my wastage, it is evident that experiments could not be instituted at that time. The energy with which the operations of the mint have been conducted, is shown by the little delay experienced between the time when operations ceased on the old account and began on the new, and that too while important modifications were going forward to facilitate the refining of the largest quantities, which may probably be received; on this point please refer to my letter of Dec. 20, '50.

5. Mr. McCulloh proposed a new plan for remedying the defect of his process, which succeeded on a small scale, but to test which on a working scale, required a large cupel furnace. There was no place in the mint in which such a furnace could have been erected, until some time in December 1850, when, the new building in the mint being completed, I was put in possession of a space wherein to extend my operations, and where I immediately commenced erecting such a furnace, and making such improvements as would be adapted to any process that might be adopted. These improvements have been pushed forward with unusual activity, so that I believe we shall be able to use them within four or five days.

6. Although we are able to work by the present process as much gold as is likely to be brought to the Mint, yet I think it would be desirable to have another process, if superior to the present. It should be less costly, in which respect Mr. McCulloh's is superior to the present, and mine is superior to his.

If it is to be used in California, or where it would be difficult to procure a supply of acid, then Mr. McC's is better than the present and mine requires still less acid than his.

It should take as little, or even less time than the present method, in which respect, his process I believe to be superior to the others. It would be desirable to work it without the use of silver, in which both our processes are better than the present.

It is desirable to have a process which shall throw off little or no acid fumes, and, in this point, mine is better than the present, and Mr. McC's better than either.

The difficulty in Mr. McC's process is obtaining a toughened gold adapted to the coiner's use.

Both these difficulties may probably be solved within a week or ten days from the present date.

I have thought it not improper, dear sir, to offer a few remarks, not called for, in your queries, and submit the whole for your consideration.

With respect and esteem
dear Sir, Yours truly
JAS. C. BOOTH.

R. M. PATTERSON, ESQ.,
Director U. S. Mint, Philadelphia.

No. 54.

WASHINGTON, Jan. 21st, 1851.

MY DEAR SIR:

In your letter to me of the 14th inst., you have stated that: "there has been no place in the mint where a test of sufficient size could be erected, and the moment the place was afforded the erection of a furnace was commenced." Yet, I left in the mint a large test or cupelling furnace, with which I have repeatedly cupelled about $25,000 of silver, as an ordinary day's work, and which would, therefore, have worked $250,000 to $500,000 of gold in a day. And in my letter to you of Sept., 23d 1850, I requested you to use that furnace, if you should try my method for refining gold.

I remember that, when I met you, early in October last, at Jones' Hotel, the use of a test for toughening, as proposed by me, was objected to by you, for the supposed reason that gold might escape into the flue and be lost; and in your letter to me of Nov. 25th, 1850, you stated that, having objected to the method of toughening proposed, you had been trying others. But, I have yet to learn from you, why it should have been found necessary to erect a new furnace, merely for the purpose of trying my process, if the old test furnace is still in existence, or has not been torn down since I requested you to employ it; or why, if the use of a test or cupelling furnace is, at length, about to be tried by you, it should be deemed by any one a modification or improvement upon the process specified in my patent; or, why the suggestion of using muriatic acid, as a means of obviating brittleness should be ascribed to me, as I have no recollection of having ever proposed, and would have deemed such means objectionable, *a priori*, and as I do not find any allusion to such a proposition in our correspondence; of which

my file is complete, with the exception of copy of a letter of mine (written in reply to yours of Aug. 13th, 1850,) which you have promised to me, and of which promise I remind you, that it may now be fulfilled.

In stating that my process may be shown in 48 hours to be all that is needed, I did not assert that I could "satisfy any one of its superiority," for there are persons, not far from you, whom I would not expect to be satisfied of such a fact even upon demonstration; and who, after I had left the mint, as I have been informed by you, condemned and would have torn down the apparatus, devised and constructed by me for refining gold by steam, if such a proceeding had not been resisted by you, because it would have stripped you of the power to do your work. But which very apparatus they seem of late to have considered most valuable, and to be greatly enlarged, instead of substituting either your process, which you have pronounced to be so superior in efficiency and economy, or mine which I know to be so, in the place of that in use.

I cannot consider any reason sufficient for your continuing to keep me in ignorance of the difficulties which you may have met with in trying your own process upon a large scale. And as you have assured me that you can report on both of the processes favorably this week, unless you are deceived in each of them, I must, in the absence of such information, regard any omission to do so as evidence, not of the want of requisite apparatus, but of inefficiency in your own process.

Very respectfully,
Your obedient servant,
RICHARD S. McCULLOH.

Prof. JAS. C. BOOTH,
Melter and Refiner of the U. S. Mint, &c.

No. 55.

PHILADELPHIA, 23d Jan., 1851.

DEAR SIR:

Your favor of 21st inst. lies before me. Notwithstanding my endeavors to satisfy you on points noted in your former letters, and my assurance that my time was much occupied, you still urge the same and other matters, which would require a lengthened exposition. I am so much occupied in the prosecution of my, at present, arduous duties as melter and refiner, that

I must give it again as a reason for not entering more fully into all these points. You must be aware that a short hour's conversation here at the mint, where the position and state of things can be seen in the time that would demand hours of description by letter, and where question and answer can be rapidly put and answered, which might, from the character of our exchange of thought on paper, require weeks to do by letter; that all difficulties between us might be easily set aside; and had you called at the mint, on your last passage through this city, probably much time might have been saved.

There is only one point in your letter to which I can now allude, which I am the more anxious to do, lest I may have done you injustice previously, and that is, in regard to the use of muriatic acid for toughening the gold derived from your process. I had prepared a quantity of this gold in a large operation, say $100,000, and was much pleased with the first part of your process, without knowing at the time that it was yours. But when I found it so brittle, I was very much at a loss, and began to think of ways of toughening it, and tried them without much success. You passed through the city twice, while the brittle gold was here, and suggested to me no way of toughening it. After your first visit, Mr. Monell told me, and I understood him that it came from you, that it might be effected by muriatic acid. I thought this impracticable and did not try it on a large scale. After your second visit, he suggested the cupel, as coming from you. This I objected to at the time and for a long time after, as you mention in your last letter, fearing loss, which I, as melter and refiner, was bound to guard against. In reference to the removal of the cupel that was here, and the erection of a new furnace, five minutes in the mint would satisfy you. I shall this day begin to warm up the new furnace and will, no accident preventing, try its melting capacity on Monday next.

Very respectfully yours, &c.,

JAS. C. BOOTH.

Prof. R. S. McCulloh,
Washington City, D. C.

No. 56.

Washington, January 23d, 1851.

Sir:—Copies of your letters of Sept. 10th, 1850, and of the

11th inst., to the Director of the mint, instructing him to have trials made of processes for refining gold, as well as copies of his reply to you of the 14th inst., and of an enclosed communication of Prof. Booth of the 13th inst., having been furnished to me, for my information, I feel called upon to submit the following observations for your consideration.

In the first place, the statement of the Director, that prior to your letter of the 11th inst. the Department never referred Mr. McCulloh's process to him for examination, appears somewhat inconsistent with the fact, that in the instructions to him, in your letter of Sept. 10th, 1850, you requested him to compare the proposed plan of Prof. Booth, in all results, with any other used or known at the mint; for my process was then known to him and to Prof. Booth, the melter and refiner of the mint.

I would respectfully invite your attention to the circumstance that, in the reply of the Director of the mint, he has taken leave altogether of the expressed wish of the Department, that the methods of refining gold, invented respectively by Prof. Booth and myself, should be tested *in the presence of both* parties; and that, he has not reported, as by you requested to do, when he can enter upon such a trial and the probable time it will require; but has, in avoidance of those instructions, concluded that trial of these inventions need not be made in the presence of both parties, erroneously assuming that my presence is and will be unnecessary, even in trials which he proposes shall be deemed final and decisive, as the interest, integrity and energy of Mr. Booth may and should be regarded as giving the fullest assurance that the work will be properly done in my absence, and *de facto* maintaining that a trial of either invention in my presence would be useless, notwithstanding your express instructions that both should be so tried without delay.

Although the Director of the Mint treats the fact of an union of interests, as a reason why the experiments, made in the Mint on the aforesaid methods, have been confided independently to Prof. Booth; yet, as that union was based upon averments of Prof. Booth that his process of refining was more efficient and economical than any other known method, of course including my own antecedent invention, whereas it now appears, from letters of the Director of the Mint as well as of Prof. Booth, that he has not met with success in trying his own method, there would certainly be an eminent propriety in my being permitted to judge for myself, by observation, of the nature and degree of the defects of the process of Mr. Booth; especially, as I have been and still am kept in ignorance thereof, after having re-

peatedly requested information of him. And of my own method which I know to be efficient, if Prof. Booth, after varied experiments, has failed to work it upon a large scale, there was certainly more than sufficient reason for its being tried in my presence and according to the specification of my patent. That much time may have been spent in unsuccessful experimenting is very probable, but my invention should not be considered defective, because of its mismanagement by others.

In suggesting to you that an immediate trial of both processes should be made in my presence, the fact of my being at leisure, owing to a vacation in the College with which I am connected, was taken into consideration by me. Now, that vacation is about to close and I must again enter upon the active performance of my official duties.

In my letter to you of the 1st inst., I remarked, that "the Mint at New Orleans is not provided with a large cupelling furnace and other apparatus suitable for a trial upon a large scale, but that such has not been the case at the Mint in Philadelphia." This declaration of mine appears to be directly at variance with the statement of Prof. Booth, in his communication of the 13th inst. to the Director of the Mint, which is as follows: "Mr. McCulloh proposed a new plan for remedying the defect of his process, which succeeded on a small scale, but to test which on a working scale required a large cupel furnace. There was no place in the Mint in which such a furnace could have been erected until some time in December 1850, &c." I must, therefore, remark, that I left a large cupelling furnace in the mint; that, in a letter of Sept. 23d, 1850, to Prof. Booth, I requested him to use it, if he should try my process; that when I saw him in October last he objected to the use of such means, not, however, because of any alleged want of a proper furnace; and that, if it is now necessary to erect a new furnace to try my method, the old one must have been pulled down, and most probably since I made that request.

Again, as in the specification of my patent I use the language: "Finally, the operations are terminated by cupelling the refined gold, or melting it with such fluxes as borax, nitre, &c,"—I cannot imagine why Prof. Booth should speak of this operation of cupelling, as a new plan for remedying" an imaginary defect of my process; nor why the Director should call it "an improvement suggested to remedy a defect." Cupellation forms part of my original patented method, the part to which Prof. Booth objected, and which, if now about to be tried by him, as it might and should have been six months ago, is a recourse to

remedy the defect, not of my patented invention, but of his own experimental proceedings thereon since July 1850. In another passage of his letter, he says: "Nor did the expedient proposed by Mr. McCulloh, by using muriatic acid prove successful in removing the brittleness;" on this I should remark, that I do not recollect ever to have made such a proposition, or to have seen or heard of it before, a proposition, which, as a chemist, I should have deemed inadmissable.

As Prof. Booth has said that he experimented from the time of entering upon the duties of his office in December 1849, being impressed with the view that a new process of refining was desirable, and as I had discovered a new method, which, by letter addressed to the Director of the mint on the 11th of February 1850, I offered to the Government, but received no reply thereto, it may be proper that I should remark, that when Prof. Booth believed he had discovered a new process, as he has stated, he wrote to me on the 29th of June 1850, proposing a union of interests, and adding that his "object was not for the mint," but that he intended "to engage some friends in Philadelphia to carry out the refining on a large scale." Of the experiments upon my method which "left the gold in such a brittle state as to be valueless for the coiner," I should say: that they were improperly tried in the mint, in July 1850, in my absence, and without my concurrence or instructions; and that the imperfect results obtained should have been promptly communicated to me; but this was not done, until after Prof. Booth had evolved his new process, and had made application, dated Aug. 5th, 1850, for letters patent therefor, which were issued to him in September, the Director of the Mint having urged prompt action thereupon.

And as the subsequent experiments of Prof. Booth, both with his own patent process and with mine, have hitherto been unsuccessful, I should likewise remark that, in so far as they relate to my method, he has varied them as he alone saw fit, neither following the specification of my patent, nor heeding my views and wishes expressed to himself; and that of such experiments there may have been enough, perhaps more than enough.

In conclusion, since, in compliance with my request, copies of letters to and of the replies from the Director of the Mint have been furnished to me by the Department, among which I find your letter of the 11th inst., instructing the Director to try the aforesaid inventions in the presence of both Mr. Booth and myself, and thus justly and substantially according what I had asked in my letter to you of Dec. 23d, 1850,—it seems right that I should state that, subsequently to the last mentioned date, sev

eral letters have passed between Prof. Booth and myself, and that I should herewith present copies thereof for your further information.

Very Respectfully
Your ob't Ser't.
R. S. McCULLOH.

Hon. Thos. Corwin,
Secretary of the Treasury.

No. 57.

Washington, Jan. 27th, 1851.

My Dear Sir:

As in your letter of the 23d inst., you say, that I passed through Philadelphia twice, while the brittle gold was there, without suggesting to you any way of toughening it, I feel called upon to observe: that, upon the first of the occasions referred to by you, which happened about the 11th of July, I did casually remark, if I remember aright, upon the necessity of preventing the accidental formation of sulphate of lead, as a latent cause of brittleness in refining gold with the zinc of commerce; although brittleness is the ordinary result incident to the "*toughening*" of gold refined by *any* process, always demanding care, skill and the judicious use of fluxes to overcome, but never deemed by expert refiners serious and insurmountable. And if I said no more upon that subject, it was because there was nothing in our interview which seemed to me to call for it, or which caused me to suppose that I was entitled to give to the language of your letter to me of July 9th, which I had just received, proffering to me a full opinion on my process of refining, as one which you had worked out in all its details upon large quantities of metal and deemed most valuable, any other than its literal meaning; nor do I see, that I would have been, or am even yet at liberty to do so, notwithstanding all that has since occurred.

On returning home, and finding there your letter of June 29th, addressed to me at Princeton, (not at Washington, as I may have stated, by mistake, in my letter of July 16th,) in which you spoke of your experiments as then in part successful, and alluded to some difficulties to be overcome, but of which your subsequent letter of July 9th implied that they had been

surmounted, I was prompted, in my reply of July 16th, to indicate to you the necessity of removing both zinc and lead entirely, if you would prevent brittleness from occurring upon any occasion; although, in so doing, I felt that I might be deemed obtrusive, as the experiments you were trying in the mint without concert with me, were exclusively your own, and as you had informed me, in your letter of July 9th, as above, that you had worked out the process in all its details. And had you then have sought of me any information, it would have been given, without any restriction, except that, as my application then rested in caveat, my method should not be made public, so as to jeopard my obtaining a patent in England, nor be used in the mint otherwise than experimentally. But the first intimation, I had of your having found what you considered a serious difficulty in refining gold with zinc, was given to me after you had applied, on the 5th of August, for a patent for another process of refining; and it was contained in your letter to me of August 13th, informing me that you had worked $100,000, which proved brittle, but that you had not tried many experiments with it, nor had time to do so; and that C. Morfit and yourself had consequently been working out another process of refining on different principles.

With reference to my second visit to which you allude, and which occurred about the close of July, I have only to say, that you were then absent, and had gone, I was told, to Baltimore; you being then engaged, as I have since understood, in evolving your new process by experiments made by you, in association with C. Morfit, Esq., in the chemical laboratory of the U. S. Arsenal, near that city.

In reply to your remarks about the advantages which might have resulted, if I had called at the mint on my last passage through Philadelphia, or which might now flow from an hour's conversation, if held with you there, I have merely to observe: that, without authority from the Treasury Department, I could not, consistently with self-respect, have gone to the mint to inquire into any thing done by you under the instructions and superintendence of the Director of the Mint, whom I have good reason to believe to be personally hostile to me, notwithstanding that, in your letter to me of Sept. 21st, you expressed the fear, that what you had said to me of that hostility might have led me to suppose it to be greater than it is; and if such were my views before, still more are they so since the Director of the Mint has taken leave of, and treated as unnecessary, the instructions given to him by the Secretary of the

Treasury, in his letter of the 11th inst., directing that trial of both processes should be promptly made in my presence as well as in yours; an avoidance of orders, which I can ascribe only to feelings of animosity to myself, as they were evidently both just and expedient.

Neither you nor any one else need be surprised that I should now lay particular stress upon the propriety of an authorized trial of both processes in my presence, since, in my letter to you of Sept. 23d, I clearly indicate, to you my purpose to attend to the duty of looking after my own interests, and since, while the Director of the Mint has been writing about your trials of your own process and mine as unsuccessful, I have received from you, in reply to my repeated inquiries, mere allusions to unforeseen difficulties and embarrasments as to your own method, and discouraging objections and statements concerning mine; although this has been successfully tried upon a working scale by others, and might, therefore, have been shown to be efficient, rapid and economical; which would have obviated even the apparent necessity of expanding the slow, costly and, therefore, very inferior refining arrangements used in the mint. The course of action pursued at the mint, since I communicated to the Director, in a letter of Feb. 11th 1850, the fact of my having discovered a new and very superior process of refining, and more especially since my communication upon the same subject, of July 1st, 1850, to the Treasury Department, referred on the 2d of July to the Director of the mint, may appear to you and others reconcileable with a proper discharge of public trusts and duties. But, I must confess, that to me that course seems to have been regardless of what was due to myself, to the depositors of bullion and to the government.

Very respectfully yours,

R. S. McCULLOH.

Prof. J. C. Booth.

P. S. As I presume your delay to furnish me with the copy of my letter to you of Aug. 14, which you promised me, is due to your engagements, I enclose a gold dollar which you will please to pay to whomsoever you may employ to make it, and if the expense be greater I will defray it with pleasure.

No. 58.

[By Telegraph.]

NEW-ORLEANS,
Jan. 25th, 1851.

For Prof. R. S. McCULLOH,

Four hundred ounces of California gold* were refined by your process and perfectly toughened in a black lead crucible. Fineness nine hundred and ninety five. A test furnace would be advantageous.

M. F. BONZANO.

* At about eighteen dollars per oz. the value of 400 oz. of California gold would be $7,200 nearly. R. S. M.

No. 59.

WASHINGTON, Jan. 29th 1851.

SIR:—Herewith I have the honor to submit for your consideration copies of a letter of the 23d inst., which I have received from Prof. Booth, melter and refiner of the mint at Philad'a and of my reply thereto; also copy of a telegraphic communication to me of the 25th inst., from the melter and refiner of the Branch Mint at New-Orleans.

Very respectfully
Your ob't Ser't
R. S. McCULLOH.

Hon. THOS. CORWIN,
Secretary of the Treasury.

No. 60.

PHILADELPHIA, 30 Jan. 1851.

DEAR SIR:

I trust that I may ever hold my public obligations superior to private interests; nor shall the tenor of your recent letters interfere with my faithful discharge of those obligations, according to my judgment and ability, both in reference to my gener-

al duties as Melter and Refiner of the Mint, and my special duties to examine carefully the processes in question. But the tone of your letters urges me to request that our correspondence may cease, and that, if you have any further communications to make in relation to the operations of the mint, they may be made through an official medium. In returning the gold dollar, herein enclosed, allow me to say that I do not recollect ever promising you the letter in question, but when I shall have leisure, I will look into this matter.

Respectfully yours,

JAS. C. BOOTH.

Prof. R. S. McCulloh,
Washington City, D. C.

No. 61

To His Excellency Millard Fillmore,
President of the United States:

Sir:—As melter and refiner of the Mint at Philadelphia, in the year 1849, I did, by the invention and construction of simple apparatus, introduce the use of steam in the art of refining gold; and I, thereby, greatly augmented the power of the Mint to refine California and other gold bullion without changing the chemical method employed.

For my aforesaid invention, which was capable of being, and has since been, greatly expanded by simply enlarging the apparatus, constructed at first upon a necessarily restricted scale, I neither sought exclusive right nor have asked any benefit. But having completed it and established its advantages, I accepted the appointment of professor of Natural Philosophy in the College of New Jersey, at Princeton, and resigned the office I held in the Mint.

Before leaving the Mint, I felt convinced that much more rapid and efficient chemical means than any then known would be requisite to permit the increasing deposites of California gold to be refined with proper despatch and economy. And I sought to discover such means by experiments, tried openly in the mint, at first upon the agency of chlorine unsuccessfully, and subsequently with imperfect though promising results upon

an alloy of gold with zinc, which I made known to the Director of the Mint.

After having settled at Princeton, I perfected my method of refining with zinc, and in pursuance of advice given to me by my friends, I filed a specification as a caveat, that I might secure a patent in the United States and obtain patents in Europe.

On the 11th of February, 1850, I wrote to the Director of the Mint, informing him of the great advantages of my new mode of refining gold, and offering it for the use of the government. He received my letter, but made me no reply.

To the Hon. W. M. Meredith, Secretary of the Treasury, I addressed a letter, on the 1st of July, 1850, setting forth the financial and economical importance of obtaining the right to use my discovery, and offered any information relative thereto, though the specification of my patent then rested in caveat. My communication was referred by him to the Director of the Mint, for his views, on the 2nd of July; who reported on the 6th of July, that he was in ignorance of my process, that neither he nor any officer of the Mint had been made acquainted with the results, and that no opinion of its merits could be properly given until the process should be fully made known to the officers of the Mint and be tried upon a large scale.

On the 5th of July, having been advised that legislation would be necessary to enable the government to purchase the right to use my invention, I memorialized Congress upon the subject; a copy of which memorial is enclosed.

In a letter, dated July 9th, 1850, the melter and refiner of the mint, Prof. J. C. Booth, wrote to me, at Washington, that he "had every reason to believe he had been pursuing my method of refining for the past few weeks;" that the Director of the Mint had shown to him the letter of the Secretary, in relation to my communication, and had learned from him that he supposed he knew what the patent was, and that he "had been working with it for some time;" also that the Director supposed that a large sum would be asked for it, to which he had replied that he "thought it worth it, and that if it were" his patent he "would value it very high, say $50,000 in the United States, or possibly double that amount." In this letter Prof. Booth likewise informed me of his having written to me at Princeton, some days before, on the subject of his experiments upon refining with zinc, and proposing the union of his method with mine, not knowing that "I had completed" my

process; he stated that he had "worked a few hundred pounds of gold with zinc, in various ways," and thought "that the cost may be reduced to very low rate;" cautioned me to guard my patent on one point, to which however I had already attended: and apparently abandoning all idea of participation in pecuniary benefit, he wished me all success and proffered to me the assistance of an opinion upon my process, as he had "worked it all out in detail on large quantities of metal."

On returning home to Princeton, I found there the letter referred to by Prof. Booth, dated June 29th, 1850, in which he wrote that he had "been experimenting a good deal to find out new methods of refining the California gold," and had "succeeded in part by the use of zinc," that he wished "to ascertain whether" we could "unite our processes, so as to be mutually beneficial," that he had "just worked off a large lot of gold with tolerable facility," and that his "object" was "not for the mint," but that he intended "to engage some friends in Philadelphia to carry out the refining on a large scale."

After having written to me as above, Prof. Booth devised a mode of refining by the agency of chlorine, for which he made application, dated August 5th, and verified by his oath, in Washington, on the 7th of August, for letters patent; which were granted to him on the 24th of September, 1850; the Director of the Mint having, on the 5th of September, written to the Commissioner of Patents, urging him to expedite the examination of Mr. Booth's application, that "the interests of the Mint might be promoted thereby."

In a letter, dated August 13th, 1850, Prof. Booth informed me that he had worked $100,000 of gold with zinc, which proved brittle; that he had "not made many experiments on the gold," and had not "time to do it;" and that C. Morfit, Esq., and himself had been "working out another process of refining on different principles, which he believed would "be very successful." Yet, on the 16th of August, he wrote to me from New York, that he would remain there for some ten days, and again, on the 22d of August, communicated to me, from Glen Cove, Long Island, the intelligence that he had been making an enormous profit of his stay there "by unwearied activity in rowing, sailing, bowling, &c."

On the 9th of September, H. M. Morfit, Esq., attorney for Messrs. J. C. Booth and C. Morfit, petitioned the Hon. Thomas Corwin, Secretary of the Treasury, to instruct the Director of the Mint, to compare their proposed plan for refining gold "in all results with any other used or known," at the

mint, and to report thereupon; which was accordingly done on the 10th of September, 1850, by a letter addressed to the Director by the Secretary.

And, in the aforesaid petition, the basis of an arrangement was suggested, by which, without *special legislation*, the right to use the invention of Prof. Booth for refining gold might be purchased for the mint; a suggestion, similar to that which had been previously proposed orally on his behalf, in contemplation of an union of interest, with the expressed belief, that it would be acceptable to the officers of the mint; but which had been deemed inadmissible by my counsel, because *the expense of labor and materials*, used in refining gold bullion, was *alone* authorized by law, to be charged to the depositors of such bullion for refining the same, and the price of purchasing a patent right for that purpose, could not be regarded as any part of the cost of labor and materials. And it was probably for this reason, that Messrs. Booth and Morfit subsequently memorialized Congress for such legislation on the subject.

Having been assured by Prof. Booth of the value and efficiency of his process, and that letters patent had been ordered to be issued to him for it, I made a union with him on the 12th of September, 1850, by assigning to him a moiety of my invention, in consideration of his conveying to me a moiety of his own. And we then concurred in offering both processes to the Government through Congress, on the terms originally proposed by me for mine alone, to wit, either a just sum in gross, or a fair share of the saving to be effected in labor and materials only; in consequence of which, an appropriation of $25,000 was made to enable the President to obtain the right to use the said methods, or any other method which may be discovered, if he should deem it expedient to do so.

Since the passage of the aforesaid enactment, framed by the Committee of conference, and not by the undersigned, experiments, professedly designed to test the merits of the aforesaid inventions, have been conducted in the mint by Prof. Booth, acting under instructions of the Director, in obedience to the aforesaid letter to him, of September 10th, from the Secretary of the Treasury. But, in so far as they have related to my method, Prof. Booth has, avowedly, set aside and objected to the trial of the preferred means, described in the specification of my patent and indicated in my letters to him; in consequence of which, or of other mismanagement, he has been obtaining unsuccessful results. Concerning his own method, he has alluded to unforeseen difficulties and embarrassments, but when interrogated, as to the facts in his trials, by me, as assignee of one

half interest in his patent, acquired under implicit reliance upon his assurances of its great value and efficiency, he has studiously kept me uninformed. And of all his experiments the Director has several times written, that they have proved unsuccessful.

Justly dissatisfied with this state of things, I wrote to the melter and refiner of the mint at New Orleans, resquesting him to try my process of refining upon a working scale, which has been done by him, with perfect success, after he had gained experience by two or three trials, and without the advantages of the most approved apparatus. Also, on the 23d of Dec. last, I addressed a letter to the Secretary of the Treasury, asking him to instruct the Director of the Mint to cause both processes to be tried without delay and in my presence; which was accordingly done on the 11th of January. But instead of obeying the orders given to him, the Director of the Mint has disregarded them, and in a letter of the 14th ult., to the Secretary, he has treated his instructions as unnecessary.

Not wishing to ask the Secretary of the Treasury to take any action in relation to such a case of insubordination to his own immediate orders, nor to urge him to do more than he has already done, or may see fit to do of his own accord, to protect my own and the public interests, I have deemed it to be my duty, reluctantly, to submit this whole matter to your consideratien, to request your prompt attention to it, and to say to you:

That I have no confidence that a fair trial of either invention will be made in the mint by Professor Booth alone:

That I have good reason to believe the Director of the Mint to be influenced by hostility to me, incurred by reason of my having been obliged by my sense of duty, as an officer of the mint, to decline to furnish facilities to the coiner for carrying on in the mint the business of manufactnring medals for his private gain, which I considered to be illegal, and calculated, by example, to demoralize the persons employed in the mint, though sanctioned by the Director:

And that, in view of the express contradictions and the conflicting statements, in which the director and the melter and refiner of the mint are involved, by their writings upon the subjects mentioned in this communication, and of all the attending circumstances, I am painfully convinced, and am prompted by higher considerations than those of pecuniary interest, to inform you: that a gross wrong has been committed upon me by officers of the mint, to the great prejudice of the public economy and heavy loss to the depositors of bullion, entailed by their long adherence to an expensive and slow method of refining, in order, if possible, to substitute for my process the hitherto

unsuccessful, though patented, invention of one of themselves; in regard to which, the Director of the mint, on the 5th of September last, urged upon the Commissioner of Patents prompt attention to the application for letters patent; in strange contrast with his perfect indifference to the offer contained in my unanswered letter to him of February 11th, 1850, and with his forbearance to express any opinion about, and declaration that both the officers of the mint and himself were ignorant of, the merits of my process, in his reply of July 6th, to the Hon. W. M. Meredith, Secretary of the Treasury, taken in connexion with the abovementioned statements of Prof. Booth, concerning the information he had given to the Director; or, if said information was imparted subsequently to that reply, then with his having allowed it to remain, so far as I am informed and believe, without alteration or addition.

My interests and conviction that injustice has been done me, may cause me to contemplate this subject under bias; I, therefore, prefer to make no new suggestions concerning the course to be pursued. And I ask only such action as shall consist with your sense of justice, the rights of a citizen and the public welfare, and that as early information thereof may be given to me as your convenience may permit.

With great respect,

Your ob't serv't,

RICHARD S. McCULLOH.

Washington, February 5th, 1851.

No. 62.

WASHINGTON, February 5th, 1851.

SIR:—I enclose a copy of a letter, dated January 30th, 1851, received by me from Prof. Booth, in which, instead of giving me information concerning his experiments, he has requested me to communicate with him henceforth through an official medium, which would ordinarily be through yourself, as the Head of the Treasury Department.

But, inasmuch as your order to the Director of the mint, to test with as little delay as possible, the method of refining gold patented by myself, as well as that by Mr. Booth, in the presence of *both* of us, as contained in your letter to that officer of the 11th ult., has been disregarded, for reasons which, however satisfactory to Dr. Patterson, were yet inadmissible, as the manner of making the requisite trial of the aforesaid methods

was not confided to his discretion, but was by you justly and expressly prescribed, in pursuance of my own request as a party of interest,—I have felt unwilling to ask you to reiterate that order which has been treated with contumacy. And with a desire to be most courteous towards and considerate of you, I have laid the whole subject before the President, forbearing to make any new suggestions and asking only such action as shall consist with his sense of justice, the rights of a citizen, and the public welfare, as well as that I may receive early information thereof.

When I requested you to give the aforesaid order, it would have been to me entirely convenient to have attended at the mint, the College of New Jersey being in vacation; but now, I must resume my official duties in that institution, which demand my presence, and I go there to-morrow.

If Mr. Booth's method is, as it may be, a failure, and therefore without value, for his own experiments with it since it was patented seem not to have been satisfactory, and the reports of the Director about it have been unfavorable, while the facts have been studiously withheld from me, it follows, as a consequence, that under the enactment in the civil and diplomatic appropriation bill, the President could not use any part of the appropriation for the purchase of my invention, however efficient and valuable it shall be found to be, although he might give the whole sum for the process of a third person. Whether legislation may not, therefore, be necessary upon this subject, and should not be promptly applied for by me, is a question which I now hold under consideration.

Very respectfully,
Your ob't serv't,
RICHARD S. McCULLOH.

Hon. THOS. CORWIN,
Secretary of the Treasury.

No. 63.

TREASURY DEPARTMENT,
February 12th, 1851.

SIR:

I have the honor to enclose to you, by direction of the Hon. the Secretary of the Treasury, copy of a report from the Director

of the Mint at Philadelphia, on the subject of your new process for working gold, and am,

Very respectfully,
Your ob't serv't,
W. L. HODGE,
Ass't Sec'y Treas'y.

RICHARD S. MCCULLOH, Esq.,
Princeton, N. J.

No. 64.

MINT OF THE UNITED STATES,
Feb. 11th, 1851.

SIR:

I have the honor to report, that an experiment on the parting process of Mr. McCulloh has been prosecuted to success, so far as to prove that malleable gold may be procured by it. The *practicability* of the plan is, therefore, for the first time, proved; but its *feasibility*, by comparison with other known methods, is yet to be shown. To this end, an accurate experiment will be made, with a delay of a few days, in which the expense, labor, time, wastage and other particulars will be taken into particular consideration.

An objection has been suggested to the plan, which this experiment will serve to contradict or verify; but which, if it be well founded, is conclusive as to its inexpediency. I refer to the supposed hazard of loss of gold. Zinc when melted with other metals has the property, at a certain temperature, of escaping into the atmosphere, carrying with it the metal with which it is mixed. The commencement of Mr. McC.'s process requires the melting together of zinc and gold; and it has been suggested that the gold will sustain loss thereby. You will perceive, therefore, how important a further experiment on the plan may prove.

Very respectfully
and faithfully yours,
R. M. PATTERSON,
Director.

Hon. THOS. CORWIN,
Secretary of the Treasury.

No. 65.

PRINCETON, Feb. 14th, 1851.

DEAR SIR:

Please accept my thanks for the copy of the letter of the Director of the Mint to you of the 11th inst., furnished to me by your order. Concerning which letter I would remark, that it serves only to show that the melter and refiner of the Mint, Prof. Booth, has at length found it practicable for him to toughen gold by my patented process, satisfactorily even to the Director of the Mint. Why he has not done so long ago, he alone can explain; for he possessed every facility that could be desired, and in his letter to me of July 9th, 1850, after informing me that he had "worked a few hundred pounds of gold with zinc in various ways," he offered me "a full opinion" on my method of refining, as he had "worked it all out in detail on large quantities of metal;"—also in his letter to me of Nov. 25th, he said: "I have obtained toughened gold by both processes, and can work either of them on a large scale." Moreover, the *disinterested* melter and refiner of the branch mint at New-Orleans has found no great difficulty in promptly proving the "practicability of the plan," without such facilities as have been deemed indispensable for that purpose at the Philadelphia Mint; and I could myself have readily done the same, if a trial of my invention had been properly made in my presence, as ordered by you in your instructions of the 11th ult., to the Director of the Mint, which he saw fit to disregard and disobey.

Of the new and *hypothetical* objection brought forward by the Director of the Mint, that, in my process, zinc may escape into the atmosphere, carrying with it the metal with which it is mixed, and that gold may "sustain loss thereby," I should say: that such may be the case, if the alloying be done with gross carelessness, or wilful mismanagement, but not if proper skill and care be exercised.

But it is not in relation to my own invention, which is not upon a trial authorized by you and sanctioned by me, that I now feel called upon particularly to address you, so much as with reference to the patented process of Messrs. Booth and Morfit. Concerning which, I have good reason to believe, and am now fully convinced, after a personal interview with Mr. Morfit, that it has proved an utter failure, under the management of Prof. Booth himself; so that the union between us, by mutual assignment, recorded in the Patent Office, has in all probability been without valuable consideration upon their part, and would, therefore, be void in equity and law.

Under such circumstances, legislation seems to be necessary to permit the right to use my process to be acquired by the Government; and a grave question involving higher considerations than those of money has to be disposed of, before any sale can be made. As, however, I have, in consideration of yourself, submitted this matter to the immediate attention of the President, for his judgment and action, I feel it to be my duty at present to refrain from expressing any further wishes or suggestions.

With high respect
Your ob't Ser't.
R. S. McCULLOH.

Hon. Thos. Corwin,
Secretary of the Treasury.

No 66.

Washington, Jan. 4th, 1851.

My dear Sir:

As you lately requested me to furnish you a copy of the correspondence between the Director of the Mint and myself, in relation to the manufacture of medals in the mint, and as one has been placed at your disposition, I deem it proper likewise to submit the following statement.

Soon after I entered upon the duties of the office of melter and refiner of the mint, in 1846, I was requested by the coiner, Mr. Peale, to furnish him, in conformity with usage, with some ingots of fine silver to make medals for the Indian tribes; which request I complied with. And, as he promptly returned me an equivalent amount of silver, I did not entertain any doubt that I had therein performed a regular and proper official act.

During the ensuing year several similar transactions occurred between the coiner and myself; his applications being complied with by me, in confidence of their propriety.

Doubts were subsequently awakened in my mind by several occurrences, to wit:

1st. The foreman of the silver melting room, being requested by Mr. Peale to get the moulds ready for casting ingots for a lot of medals to be made for the Franklin Institute of Pennsylvania, refused to do so. Complaint was consequently made by Mr. Peale to me, as the officer in charge of the melting operations. When simply interrogated by me, the foreman replied: that the manufacture of medals formed no part of the proper work of the mint; that Mr. Peale carried it on as a business

for his own profit, and paid nothing to those who had to perform the work for him; and that he did not wish to do any thing either for Mr. Peale or the Franklin Institute. He was apparently excited, and ascribing his action rather to feeling than anything else, I replied: that he was probably mistaken in believing that Mr. Peale would realize any profit from medals made for a public institution designed to promote the arts and sciences; that the work was doubtless gratuitous, and prompted, on the part of Mr. Peale, only by a commendable public spirit; and that he would, therefore, oblige me by making the ingots. His reply was, as recollected by me: "I will gladly do, sir, any thing you may request, but in making medal ingots I wish it to be understood that I consider it no part of my duty. And when you, sir, have been long enough in the mint to know about this medal business, you will think differently of it from what you do now."

2d. Upon the occasion of the visit of President Polk to the mint, the coiner, Mr. Peale, presented to him a copper medal, struck for the purpose. A few days afterwards, a bill for that medal, made out in a sum much greater than it could possibly have cost, and not in the name of Mr. Peale, but in that of a workman who was not entitled to the money, was presented, by that workman, and paid out of the contingent fund of the mint by one of the clerks. This circumstance being made known by that clerk to the Treasurer and other officers, and being disapproved of them, Mr. Peale, instead of causing the money to be restored to the United States, as should have been done, suffered it to be refunded chiefly by his colleagues, himself becoming a contributor.

3d. A lot of medals, for a corporation in Massachusetts, was made by the coiner, out of silver advanced by me, according to usage; but, instead of promptly returning to me the equivalent quantity of silver, he delayed to do so for several weeks.

This delay drew my attention to the propriety of these transactions, and led me to examine the laws of the United States, for the purpose of ascertaining whether I could legally advance bullion to any officer of the mint. As I did not find authority for so doing, I submitted to the Director the question, whether or not I had any right to deliver medal ingots to the chief coiner, as had been customary both before and after I entered upon the duties of my office. He decided that I had none. I then offered to procure from the War Department, for the accommodatton of the coiner in preparing medals for the Government, such advances as I felt no longer at liberty to make to

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him out of the bullion in my charge. This offer he declined, and my action excited some feeling upon his part.

Subsequently, I agreed to let the coiner have medal ingots, with the knowledge and sanction of the Director, upon his delivering to me, simultaneously, bullion of equal value, as I had not then formed the opinion that the manufacture of medals, as pursued within the mint, was entirely wrong; for I had foreborne to ask questions, and, therefore, knew but little of its details, as the subject was one about which silence was generally observed by the officers and workmen of the mint. Accordingly, I afterwards did, from time to time, deliver ingots for the manufacture of medals to Mr. Peale, receiving from him simultaneously bullion of equal value.

But upon the last occasion of his obtaining metal from me, Mr. Peale requested me to let him use refined gold, with which I was charged, to prepare the medal ordered by Congress to be presented to Gen. Taylor for the battle of Buena Vista; which I consented to do, with the express understanding, that the gold, so to be transformed into a medal, should remain in the custody of Mr. Peale, as an officer of the mint, until he should deliver to me bullion of equal value to that of the said gold. But this understanding he violated, by parting with the medal, without having first delivered to me the value of the gold contained therein; and as soon as this fact became known to me, I was obliged to require him to restore to me, immediately, bullion of the aforesaid value. In reply, he objected that it would put him to inconvenience; which compelled me to make my demand peremptory, a proceeding unavoidably painful to myself, as it was of necessity inherently offensive to him. The bullion thus demanded was on the same day restored to me.

The aforesaid unpleasant occurrences led me gravely to consider all I knew about the manufacture of medals at the mint, and carefully to re-examine the laws for the establishment and regulation of that institution. And I, thereby, became convinced that I ought not to aid any officer in conducting transactions of profit, based upon work performed by the machinery and workmen of the mint, unless expressly authorized by law. Hence, when Mr. Peale applied to me for gold to be used for the medal ordered by Congress to be presented to Gen. Scott, in honor of his glorious victories during the Mexican war, I was constrained, by my sense of duty, respectfully to decline to furnish it, for reasons embodied in my correspondence with the Director of the mint, copy whereof has been furnished to you.

The last letter of that correspondence I presented to the Director, in person, and when he had read it, and had remarked

upon the subject of medals made by the coiner, without controverting any of the facts, views or reasons which I had submitted, I assured him, that I had been actuated only by a sense of duty, and that I bore towards the coiner no unkind feeling; which the latter had, I was told, imputed to me, as the reason for my having refused to furnish bullion to him.

Shortly afterwards, I took occasion to request the Director to show to the coiner, if he had not so done, the aforesaid correspondence, for the assigned reason, that I did not wish to discuss the propriety of the conduct of another without his knowledge. And, actuated by my desire and official obligation to serve the public interests, I then expressed to the Director of the Mint the opinion, entertained by me, of the want of correct judgment on the part of the coiner; justifying that opinion, by referring to the above mentioned affair of the medal presented to Mr. Polk, paid for out of, and refunded to, the contingent fund of the mint; and by remarking, thereupon, according to my recollection, that it had forced me to believe Mr. Peale, either not to have a proper sense of right and wrong in such matters, or not to be always governed by it, and that of these alternative conclusions, I preferred the former, as the most just, because the most charitable. To which the Director replied, as I remember, by remarking, that "such things are customary," and asking me whether I did not "suppose the dinner given to Mr. Polk at the Navy Yard to have been paid for out of the public purse?" I answered, "it ought not to have been, if it was."

This medal business has been carried on, with the full knowledge, sanction and concurrence of the Director of the Mint; a fact, which I cannot reconcile with the intelligence of that officer, upon the assumption, which I have felt bound to make, that he is a disinterested party; nor with his sense of justice, as I believe, that the profits thereof are retained almost wholly by the coiner, whilst the work is performed by other persons and the machinery of the mint, and that the artists of the country consider said business as an unjust monopoly, conducted by a machinist in unprofessional and improper competition with their industry, resources and talents, who derives it only from official station.

In extenuation, it may be stated, that the business of making medals in the mint originated many years since, in applications by the government to the coiner of the mint to prepare those needed by it, to be presented to the Indian tribes, or awarded by Congress to officers of our army and navy. A twig engrafted may be healthy at first, but it may grow to be a branch

full of morbid excrescences, and poisonous to the whole tree. And certainly, the Government never could have designed that the Mint should become a factory, for the fabrication and sale of premiums to be awarded at agricultural fairs and industrial exhibitions.

In conclusion, I should say, that you are, of course, at liberty to make any use, private or public, of this communication, and of the correspondence to which it refers, that in your judgment the public interest may require.

Very respectfully,
Your ob't serv't.
RICHARD S. McCULLOH,
late Melter and Refiner of the Mint.

Hon. THOMAS CORWIN,
Secretary of the Treasury.

No. 67.

U. S. MINT, Aug. 17th, 1849.

DEAR SIR:

Under present circumstances, I must decline to furnish you with gold or silver, for the manufacture of medals.

Very respectfully,
Your obedient servant,
R. S. McCULLOH.

To F. PEALE, Esq.

No. 68.

U. S. MINT, Aug. 23, 1849.

MY DEAR SIR:

A few days ago, I received, through a messenger from Mr. Peale, the chief coiner, an application for fine gold, to be used for making a medal, ordered by Congress to be presented to Gen. Scott. In a written reply, I respectfully declined, under present circumstances, to furnish him with gold or silver, for the manufacture of medals. That you may know my reasons for doing so; and that, if I entertain erroneous views, they may be corrected, it is due both to you and to myself, that I should state them unreservedly.

In the first place, I should say, that my action was entirely independent of personal considerations, and that I should cheerfully have extended to Mr. Peale the accommodation he sought, if I could have done so consistently with my views of official propriety.

I have been informed, through sources entitled to credit, that the business of making medals in the Mint, as at present conducted, is regarded in the community, as of very doubtful propriety, if not illegal.

Within the Mint, the workmen, with few exceptions, believe it wrong and unauthorized by law, that they should be required to labor for the pecuniary benefit of an officer; and they look with suspicion upon all such transactions of profit. I have myself cautiously abstained from everything of the sort, and the same course has been uniformly pursued by the assayers; any extra work done, either for the government, or for individuals, having been always performed gratuitously.

If the manufacture of medals in the Mint, for the private profit of the chief coiner, has been authorized by law, I am ignorant of the fact. If it be so, I have no objection whatever to furnish him with metal suitable for the purpose, with your sanction, and upon the terms of simultaneous interchange of equal values; if not, it seems to me improper that it should be done.

By the act of Congress of January 18th, 1837, for the organization of the Mint, the salaries of the officers are fixed; but no other emoluments are allowed; nor is the manufacture of medals authorized or mentioned in it.

In his letter of January 22d, 1841, communicating the report of the Director of the Mint, in relation to the operations of the year 1840, President Van Buren submitted to Congress the inquiry, whether authority should be given to the mint to strike off copies of the national medals in bronze, or other metal, for persons making application for them, and at a cost not to exceed the actual expense of striking them off. This inquiry was referred to a committee, but I know not what further action was taken upon it. It evidently implies, that, at that time, the mint possessed no authority to strike medals; and it carefully excludes profit, as a condition of the proposed authority.

Also, by an act of Congress of August 23, 1842, it is enacted that "no officer in any branch of the public service, or any other person whose salary, pay, or emoluments is or are fixed by law, or regulations, shall receive any additional pay, extra allowance, or compensation, in any form whatever, for the disbursement of public money, or any other service or duty whatsoever, unless

the same shall be authorized by law, and the appropriation therefor explicitly set forth, that it is for such additional pay, extra allowance, or compensation."

But if legal, I doubt whether the manufacture of medals in the mint, is expedient or right, especially when they are made for such corporations as the Franklin Institute of Pennsylvania, the Worcester County Mechanics' Association of Massachusetts, &c., &c.; private artists look with displeasure and jealousy upon competition by the workshops of the government, established for other purposes; and workmen of the mint cannot but regard with distrust the employment of those workshops, and their own time and labor, for which they are paid by the government, to carry on a private business of considerable extent and profit.

I do not design, in this communication, to prefer charges of official misconduct against the chief coiner, but merely to give you an exposition of my reasons for declining to comply with a request, which I could not grant without violation of my sense of official rectitude. I had repeatedly furnished both gold and silver to Mr. Peale, for the manufacture of medals; but I did so, at first, in confidence of the propriety of an established custom, and in ignorance of the fact that the medals were made by him as a source of profit; subsequently, and for a long time, without having fully examined and carefully considered the subject; without knowing the views entertained of it by others, within the mint or beyond its walls; and without forming a definite opinion and conclusion. And it is with reluctance, that I have been at length compelled to decline to extend to the coiner facilities which he has heretofore received.

If I err, I will cheerfully, I repeat, be convinced of error. But, if otherwise, then as an officer responsible for the bullion and public monies, when confided to the workmen in the melting and refining department of the mint, I respectfully submit, for your consideration and judgment, whether anything of even questionable authority or propriety should be done in the mint, lest its tendency be demoralizing, or calculated to impair that regard for integrity among the workmen, which is our only security.

With respect and esteem,

Your obedient servant,

R. S. McCULLOH.
Melter and Refiner.

To Dr. R. M. Patterson,
Director of the Mint.

No. 69

MINT OF THE UNITED STATES,
Director's Office, Aug. 24, 1849.

MY DEAR SIR:

I have read with care your communication of the 23d inst.; but I will now confine my answer to the circumstance which gave rise to it. I have, therefore, only to say, that as you are responsible for the bullion placed in your keeping, you have a perfect right to decline an interchange of any part of it, even for other bullion of equal value, and even if required for purposes of the government, if such be your will in the case.

Your's, with sincere friendship,

R. M. PATTERSON.

RICHARD S. MCCULLOH, ESQ.

No. 70.

MELTER AND REFINER'S OFFICE,
August 25th, 1849.

MY DEAR SIR:

Your reply of yesterday, professedly "confined to the circumstance which gave rise to" my communication of the 23d inst., simply asserts my "perfect right to decline an interchange" of bullion for other bullion of equal value, "*even if required for purposes of the government*, if such be my *will* in the case."

This language may imply, that my action, in the particular case referred to, may have been attended, either with unwillingness to facilitate work for the government, or the unnecessary exercise of a right which might properly have been waived. Such was not, I believe, the signification you designed it to convey; but, as it will admit of it, by inference, I feel called upon to make the following remarks, that I may be fully understood.

As a public officer, I have, of my own free choice, always sought to facilitate the public work, not only by the discharge of official duties, but also by the devotion, *without compensation therefor*, of a large portion of my time, since I have been connected with the mint, to the prosecution of a laborious and extended series of chemical researches for the Treasury Department; for which professional work, begun before I was appointed melter and refiner of the mint, and not yet finished, I received.

before I entered upon the duties of that office, a compensation equivalent to my present salary. To this circumstance I reluctantly refer, as evidence that I am not unwilling to serve the government.

To private citizens, I have always been pleased to impart information concerning the precious metals, either orally or in writing; and to extend, by interchange of bullion of equal value, with your sanction, any proper and legal accommodation. Not long since, in reply to an application made to yourself, as you may remember, I cheerfully promised to furnish to a private individual refined California gold, for the manufacture of a medal to be presented to the late Col. Duncan, in exchange for bullion of equal value. He did not subsequently come or send for it; but if he had done so, I should have cheerfully furnished the promised metal. If in such transactions, exempt from profit or credit, there be anything improper, I do not perceive it; and I am, therefore, willing thus to oblige any citizen.

Had I have had any reason to believe, that Mr. Peale, in superintending the manufacture, by workmen of the mint, of the medal for Gen. Scott, was, contrary to custom, not incidentally conducting an operation, for which he would receive a large compensation, I should not have declined to furnish suitable metal.

That I was not in error, in believing that the metal he sought was not to be used *solely for purposes of the government*, is proved by the fact, that from the gold which he obtained from the Treasurer, after I declined to furnish it, has been struck, not only the medal for Gen. Scott, but also one for an Association in Massachusetts.

I have objected only, to aid an officer of the mint, *directly or indirectly*, in any transaction of profit based upon labor performed by the workmen and machinery of the mint; and to the performance by any officer of such transactions. This objection I have felt it my duty to make to yourself, as Director of the mint, invested by law with its "control and management, and with the superintendence of the officers and persons employed therein."

With the highest esteem and friendship,

Very truly yours,

R. S. McCULLOH.

Dr. R. M. Patterson,

Director.